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Construction Methods

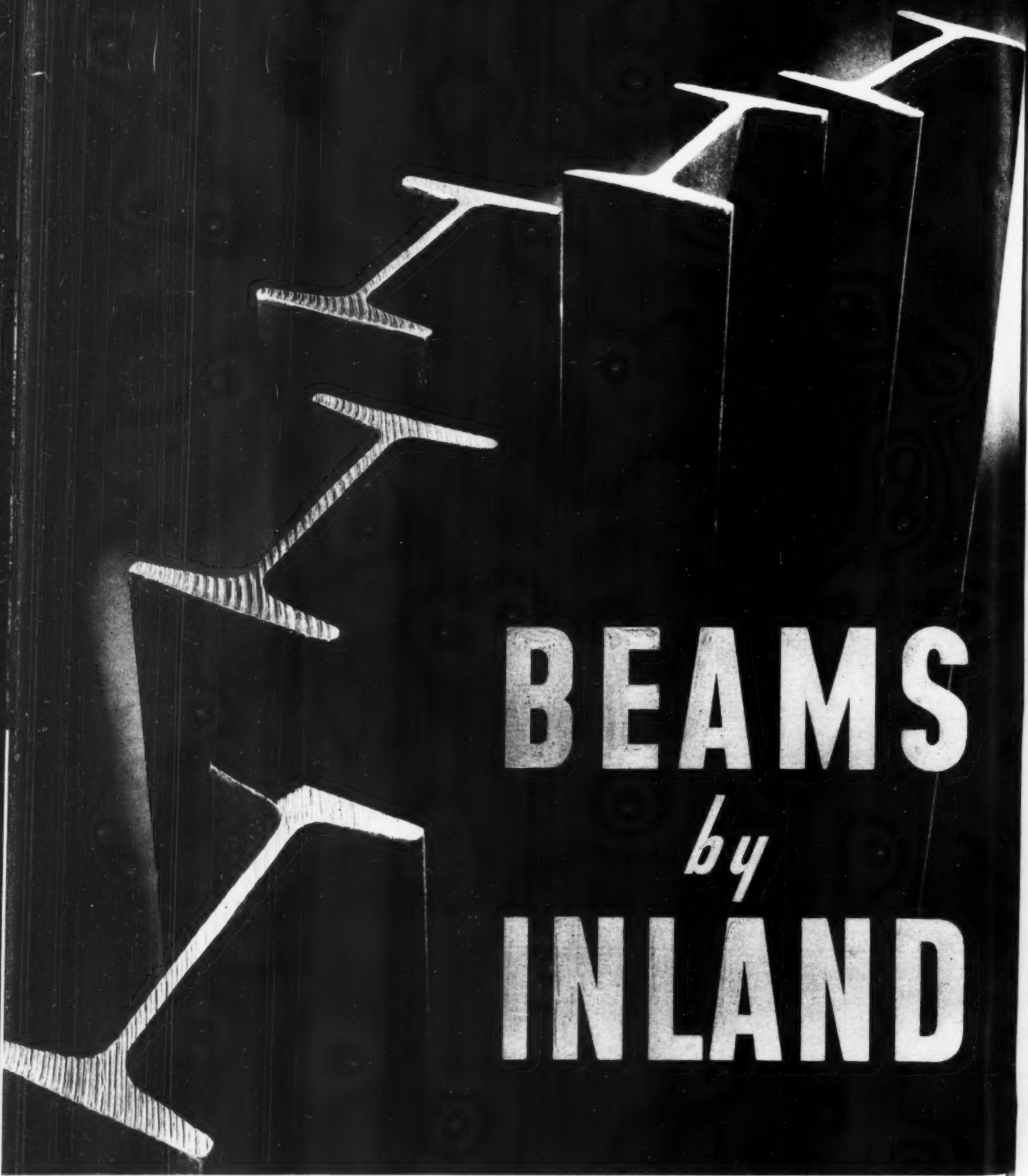
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TRAVELING STIFF-LEG DERRICK,
mounted on girders spanning trench
to lower concrete pipe sections to dis-
tribute Colorado aqueduct water to
California cities.

APRIL 1940

Distributing Water to 13 California Cities—By R. B. Diemer ★ Building-a-Day Pace on Housing Project ★ Panel Forms for Concrete Dam—By J. E. Walters ★ Butane Gas Fuel for Tractors



BEAMS *by* INLAND

TECHNOLOGY DEPT.

As a leading producer of Structural Steel and Steel Sheet Piling, Inland is in a position to cooperate closely on all design, fabrication and construction details of your projects.

Our engineers will work with you from the very beginning to the successful completion of the finished job.

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Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati

Sheets • Strip • Tin Plate • Bars • Plates • Floor Plates

Structural Steel • Piling • Rails • Track Accessories • Reinforcing Bars

CURRENT JOBS

....and Who's Doing Them

BUILDINGS

Industrial—At Freeport, Tex., a \$2,000,000 chemical plant for Dow Chemical Co. will be built by **The Austin Co.**, of Cleveland, Ohio. For Flintkote Co., at Meridian, Miss., **Rust Engineering Co.**, of Birmingham, Ala., will build a \$2,000,000 steel and concrete wallboard plant. Contract for a dewaxing plant for the Sinclair Refining Co., at Houston, Tex., went to **Lummus Co.**, of New York City, for \$1,500,000. Warehouse at Chicago, Ill., for Sears, Roebuck & Co., is under construction by **B-W Construction Co.**, local contractor, at cost of \$800,000. At Spanish Fork, Utah, **Ryberg Bros.**, of Salt Lake City, will build a powder plant at cost of \$500,000, for Illinois Powder Manufacturing Co.

Commercial—**J. M. Felson**, architect, of New York City, will represent owners on construction of two 6-story apartment buildings in Manhattan, at cost of \$825,000. **John W. Harris Associates**, of New York City, received contract for altering and improving exhibit building of Ford Motor Co. at N. Y. World's Fair, Flushing, N. Y., for \$500,000. For brick and steel hospital at Waterbury, Conn., to cost \$350,000, **Wadhams, May & Carey Co., Inc.**, of Hartford, was successful bidder.

Public—A bid of \$4,328,500 obtained for **John McShain, Inc.**, of Philadelphia, contract for a 7-story War Department Building in Washington, D. C. Hospital buildings at U. S. Marine Hospital, Carville, La., costing \$2,374,205, were awarded to **A. Farnell Blair**, of Decatur, Ga. In Brooklyn, N. Y., general contract for school costing \$1,638,000 went to **John Kennedy & Co., Inc.**, of New York. In Los Angeles, Calif., **B. O. Larsen**, of San Diego, will build the \$1,237,470 Maravilla Homes, comprising 105 one-story buildings. Housing project of 442 units in New Haven, Conn., to cost \$1,393,602 went to **William L. Crow Construction Co.**, of New York City. Elizabeth Park housing project in Akron, Ohio, will be built by **Lloyds Construction Co.**, of Chicago, for \$898,000. Garden Homes housing project in Savannah, Ga., will be built by **T. A. Loving & Co.**, of Goldsboro, N. C., for \$819,800. The Logan Fontenelle Homes addition in Omaha, Neb., went to **C. M. Dunning Construction Co.**, of Oklahoma City, for \$892,400. Successful bidder for Queens Borough Hall in Kew Gardens, N. Y., was **O'Driscoll & Grove**, of New York City, with price of \$856,000. Dutch Point Colony project consisting of 222 dwelling units in Hartford, Conn., will be built by **Edmund J. Rappoli Co.**, of Cambridge, Mass., for \$839,000. **Lovering Construction Co.**, of St. Paul, Minn., received contract for 225-unit housing project in Butte, Mont., to cost \$774,774. Ponce de Leon housing project in Tampa, Fla., went to **Paul H. Smith Construction Co.**, of Haines City, for \$747,900. **Tobias Heller & Co.**, of New York, received \$929,000 general contract for pavilion at Kings County Hospital, Brooklyn, N. Y.

HEAVY CONSTRUCTION

Successful bidders for the Nimrod dam in Arkansas, to cost \$1,100,689, were **Russ Mitchell, Inc.** and **Brown & Root, Inc.**, of Houston, Texas. **Morrison-Knudsen Co.**, of Boise, Idaho, will build the Fern Ridge dam in Oregon for \$723,592. Navy Department, Washington, D. C., awarded a \$1,545,706 contract for drydock at Mare Island, Calif., to **Ben C. Gerwick, Inc.**, and **Clyde W. Wood**, of San Francisco. **Merritt-Chapman & Scott Corp.**, of New York City, obtained contract for quay wall at South Boston Navy Dry Dock for \$1,326,666. At Chicago, Ill., subway station section will be built by **S. A. Healey Construction Co.**, local contractor, for \$1,449,064. **Del Balso Construction Co.**, of New York City, was awarded a \$240,015 contract for tunnel approaches to Queens-Midtown tunnel, New York. **Rohl-Connelly Co.**, of Los Angeles, Calif., received contract for improving 1.6 mi. of Los Angeles River at cost of \$865,678. Substructure contract for water filtration plant at Chicago, Ill. went to **Michael Pontarelli & Son**, local contractor, for \$2,231,500.

HIGHWAYS AND BRIDGES

Among recent highway and bridge contract awards are the following: Alabama: \$203,954 to **Moss-Thornton**, of Birmingham. Illinois: \$307,055 to **Harrison Engineering & Construction Corp.**, of Kansas City, Mo.; \$235,112 to **Joyce Bros. Construction Co.**, of Springfield. New Jersey: \$313,852 to **Franklin Contracting Co.**, of Newark. New York: \$1,084,861 to **Reiss & Weinsier, Inc.**, of New York City; \$2,177,480 to **Corbetta Construction Co.**, of New York City. Ohio: \$212,640 to **R. R. Helfner**, of Celina. Pennsylvania: \$738,579 to **Andrews & Andrews**, of New York; \$309,072 to **Walker Bros.**, of Chambersburg; \$208,533 to **H. W. Shaul & Son**, of Mechanicsburg; \$220,264 to **L. M. Hutchinson**, of Mt. Union; \$509,939 to **Booth & Flinn Co.**, of Pittsburgh; \$340,427 to **W. L. Johnson Construction Co.**, of Hicksville. Ohio. Virginia: \$643,585 to **Chandler Bros.**, of Virgilina. Superstructure contract for Pitt River bridge, at Redding, Calif., was awarded to **American Bridge Co.**, of Pittsburgh, for \$2,588,354. Contract for bridge construction in Massachusetts went to **M. De Matteo**, of Roslindale, Mass., for \$374,263. Grade crossing elimination contract for \$1,326,552 in New York was awarded to **C. B. Moon Co.**, of Cleveland, Ohio. In Chicago, Ill., a viaduct is being constructed by **Thomas McQueen**, of Forest Park, Ill., at cost of \$808,662. The Eel River bridge at Scotia, Calif. was bid in for \$329,989 by **A. Soda & Son**, of Oakland, Calif.

APRIL, 1940

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Established 1919

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330 West 42nd St., New York

Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

ROBERT K. TOMLIN, Editor
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Paul Wootton (Washington),
Nelle Fitzgerald

Established

in 1919

A McGRAW-HILL

PUBLICATION

The HOW of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell

- How **TRAFFIC MARKERS** of rustless Monel metal were anchored to granite block —p. 43
- How **CONCRETE AND STEEL PIPE** was installed to distribute water to 13 cities. —p. 46
- How **THICKNESS OF COAL TAR COATING** on steel pipe was tested by electric device —p. 47
- How **PULL-JACKS** stretched steel wire reinforcement for cement coating of steel pipe. —p. 47
- How **DITCH-STRADDLING MACHINE** lowered large pipe into trench. —p. 48
- How **TRAVELING STIFF-LEG DERRICK**, spanning trench, placed 46-ton concrete pipe sections —p. 49
- How **HOUSING PROJECT** was organized for speedy line-production methods to produce a building a day. —p. 50
- How **MECHANICAL POST-HOLE AUGER** dug 18-in.-diameter holes which were filled with concrete to form piers for building foundation. —p. 50
- How **BELT CONVEYOR** delivered ready-mixed concrete to hopper on mass housing project. —p. 52
- How **ROOF TRUSSES** for housing project were assembled with aid of templet. —p. 53
- How **SUBWAY EXCAVATION** was handled by large shield weighing 190 tons. —p. 53
- How **WRECKING OF BUILDINGS** was organized for salvage and re-sale of materials. —p. 54
- How **RIPPING UP OF FLOORING** was handled by special bar without destroying tongue-and-groove joints. —p. 56
- How **STANDARD STEEL BUILDINGS** were erected speedily to serve tunnel construction. —p. 58
- How **REMOVAL OF TROLLEY POLES** on street car line was accomplished with special pulling rig —p. 62
- How **ROD HOIST** raised and dumped, automatically reinforcing steel for building construction. —p. 62
- How **RINGS OF WELL POINTS** made possible excavation in the dry for pumping station in sandy soil —p. 63
- How **BUTANE GAS** effected economies as tractor fuel on road building job. —p. 64
- How **OPEN-WEB FRAMING**, for long span joists supported floors of store. —p. 65
- How **PANEL FRAMES** cut setting and stripping costs of large dams. —p. 66
- How **A-FRAMES AND RATCHET LEVER HOISTS** raised panel forms for concrete dam —p. 66
- How **SMALL TOOLS** perform useful service on construction work. —p. 70

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"You know better than that, Swanson!"



EDGAR ALLAN

'INCOR' LEADS OFF FOR THE CUBS



'INCOR' LICKED SPRING-NIGHT FROST HAZARD... CUT COSTS... EXCEEDED SPECIFIED STRENGTHS BY 41%

WHEN the umpire called "Play Ball," the new left-field grandstand at the Chicago National League Baseball Park was ready—thanks to good job planning and the use of 'Incor' 24-Hour Cement by H. F. Friedstedt Co., general contractors, who state:

"Concreting started February 3, was completed April 15. 'Incor' was used throughout, and it is needless to say that we were more than pleased with the results obtained.

"We stripped our forms in 3 to 4 days, saving through earlier re-use. Specifications called for 3000 lbs. in 28 days. Cylinders tested by Robert W. Hunt Company showed strengths of 4086 to 4421 lbs. per sq. in.—averaging 41% higher than specifications. *Results were more than gratifying.*"

It pays to estimate every job with both 'Incor' 24-Hour Cement and Lone Star Cement. Use 'Incor'* where it shows you a net profit—elsewhere, use Lone

Star, quality standard ever since 1900. Written quality guarantee with every shipment. Write for copy of "Cutting Concrete Costs." Lone Star Cement Corporation, Room 2264, 342 Madison Avenue, New York.

*Reg. U. S. Pat. Off

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'Incor' 24-HOUR Cement means just what the name says—uniform, dependable 24-HOUR service strength. AND LONG-TIME DURABILITY, TOO—proved by 13-year performance record . . . a vital advantage EXCLUSIVE with 'Incor', the FIRST high early strength Portland Cement. Quality pays . . . insist on 'Incor'.



LONE STAR CEMENT CORPORATION
MAKERS OF LONE STAR CEMENT . . . 'INCOR' 24-HOUR CEMENT

Compare the CRANE RATING

when buying your next shovel —

it is your only true measure of

STABILITY



Recently, a critical equipment buyer said the BAY CITY catalogs are the most complete, containing more real authentic data and less waste matter than any he had read on the subject of excavating equipment. By way of example we review some data taken from our catalog which is yours for the asking — no obligation.

	1/2-YARD MODEL 30	3/4-YARD MODEL 45	1-YARD MODEL 62
Weight (Shovel)	30,000 lbs.	45,200 lbs.	64,000 lbs.
Crane Boom (Standard)	30'-0"	35'-0"	40'-0"
Crane Rating — 15 ft. Radius	8,600 lbs.	14,400 lbs.	24,900 lbs.
Crane Rating — 25 ft. Radius	4,200 lbs.	7,200 lbs.	12,200 lbs.
Power, 6 cyl. gas standard	54 @ 1400	78 @ 1200	98 @ 1200
Shovel Boom	17'-0"	19'-0"	21'-0"
Dipper Sticks	12'-0"	14'-0"	16'-0"
45° Dump Height	14'-3"	16'-10"	18'-11"
45° Dump Radius	21'-1"	24'-2"	27'-2"
Crawler Width	8'-0"	9'-0"	9'-11"
Crawler Length	11'-0"	12'-6"	12'-10"

Experienced equipment buyers will agree that the only true measure of STABILITY—the only true measure of bucket capacity—is to check and compare safe crane ratings. If you keep this in mind you will not go wrong on your next purchase, whether it be for shovel, crane, dragline or trench hoe.

The higher crane ratings of the BAY CITY result from well balanced design plus long wide crawlers. There is no mystery about stability for it is a fundamental principal, known to all engineers and simply involves weight and tipping point. It costs us more money to build machines with higher crane ratings but they give you a bigger return in added performance.

In addition to the added stability and higher crane rating of the BAY CITY look also at the added strength resulting from continued use of unit cast alloy steel heat-treated bases, with large diameter swing path which is standard in all models. Wider shovel working ranges are also possible through use of powerful one-piece chain crowd from front drum, through automatic chain take-up to sturdy shipper shaft.

Yes—we would like your shovel, crane, dragline and trench hoe business, either crawler or truck mounted. At least let us tell you more about these sturdy, powerful, easy to operate, money making convertible machines—write for Catalog H-2 containing 32 pages of photos and data.

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BAY CITY

SHOVELS • CRANES • DRAGLINES • TRENCH-HOES • SKIMMERS



W. C. SHEPHERD
Lexington, N. C. Road Contract
3 EUCLIDS

ON
ROADS

VERSATILE EUCLIDS

Always Pay Well!

OR DAMS

CAN YOU AFFORD to buy specialized equipment for a single job — or do you look ahead wisely at the wide range of work you will be bidding . . . jobs with a variety of problems?

BECAUSE if you want hauling equipment which will work under the greatest variety of conditions — with a consistently low hauling cost — then you can't afford to overlook Bottom-Dump Euclids, the most versatile earth movers made . . . as proved by the wide range of kinds and sizes of jobs on which they are working throughout the country.

(Illustrated folder "EUCLIDS AT WORK" mailed on request.)



CONDON-KERNS COMPANIES
Denison Dam, Texas
17 EUCLIDS

THE EUCLID ROAD MACHINERY CO.
CLEVELAND, OHIO U. S. A.





ANOTHER 100% JOB!

reports Northwestern Engineering Company



AND MARFAK DID THIS!

NOTHING BUT MUD . . . every day . . . all day. But thanks to Marfak in the track rollers, this Caterpillar bulldozer keeps right on the job with no time out for roller troubles.

(Below) **WHEEL BEARINGS** and scraper sheaves on this Le Tourneau Scraper are also protected with Marfak. A valuable tip to contractors!



THIS CONTRACTOR had to build a road through a pass 10,000 feet above sea level, out near Dubois, Wyo. Here a tough job was made much tougher by springs and seepage that kept all his equipment working in mud.

To provide a dependable safeguard against time-eating delays and costly mechanical failures, he turned to Texaco. Starting with his dragline, every piece of equipment on the job was lubricated with the proper Texaco lubricant.

Today—4 years later, Northwestern Engineering Company's job superintendent says of this Texaco fueled and lubricated job—"excellent results."

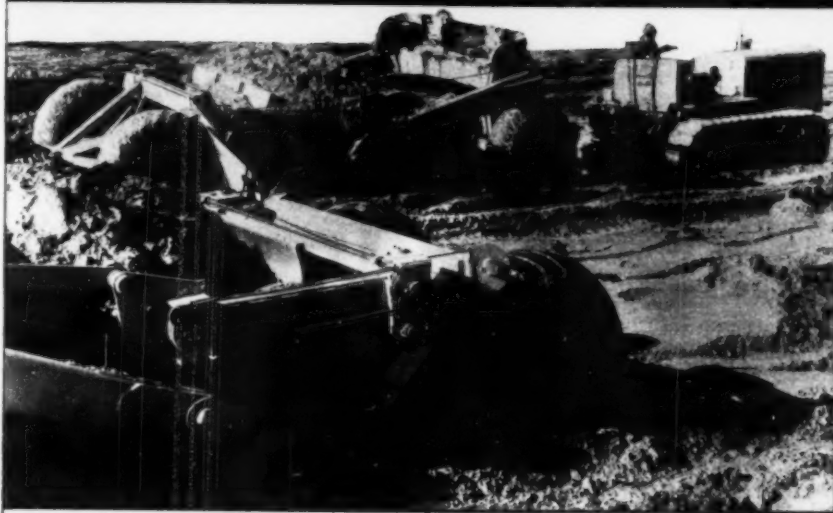
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EARTH MOVING
AND
LAND CLEARING
EQUIPMENT

CARRIMOR

Positive Ejecting Scrapers

**Load and Haul
More Material
from**

- Shovel or Dragline
- Regular Scraper Work

Here's a big, extra-capacity scraper that gives you a permanent, field-tested solution to your loading, hauling, and dumping problems. It's a double purpose tool.

Suppose, on your next job, you run into rock or cramped working quarters where digging with a shovel or dragline becomes necessary. Will you have to let your scraper stand idle while you bring extra hauling equipment into use? Not if you have a big Carrimor scraper!

These perfectly balanced, easy rolling scrapers have no overhead obstructions. You can load and haul direct from the shovel or dragline.

On regular scraper operations, loading resistance has been reduced. And it has been proved time and time again that these Carrimors load and haul more material in fewer trips and dump any type of material cleaner and faster than other scrapers. Naturally, this means that they pay you bigger returns on all jobs.

Get full details at once and compare the Carrimor feature by feature with any other scraper. See for yourself why it is receiving enthusiastic acclaim from every user.

Complete sales and service facilities available from any of the hundreds of LaPlant-Choate and "Caterpillar" dealers throughout the world. See your nearest dealer or write today for Free literature.

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RAKE-TYPE BLADE

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BULLDOZER

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BRUSH-CUTTER

STUMP SPLITTER

SNOW PLOW

Every job presents opportunities to cut production time and costs if you have proper equipment to overcome unexpected operating difficulties with speed and economy. The LaPlant-Choate line is famous the world over for its versatility—completeness—stamina—and amazing low operating cost.

All these products are balanced in strength and have maximum efficiency for they are all designed for use with "Caterpillar" Track-type Tractors only. All units are quickly and easily interchanged—thus you can make your tractor earn more money. By pulling a few pins, the operator can back out of one front-mounted tool and drive into any other—a 5 or 10 minute operation.

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Modernize with LaPlant-Choate equipment and widen your range of operations. Like hundreds of others, you'll find it a sound, money-making investment.

Famous LaPlant-Choate Trailbuilders and Bulldozers are now available with your choice of positive finger-tip hydraulic control or "Caterpillar" cable control units. This is further proof that LaPlant-Choate can meet all of your equipment needs.

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MANUFACTURING CO. Inc.
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in Stone

In stone, wood or metal there are hundreds of jobs the new Thor-Nado will do better and faster. For drilling and channeling in brick; chiseling and cleaning to remove plaster and stucco . . .

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Only 13½" long
Weighs but 14 lbs.

Specially designed, overcapacity, universal Thor motor with hand-wound armature and commutator
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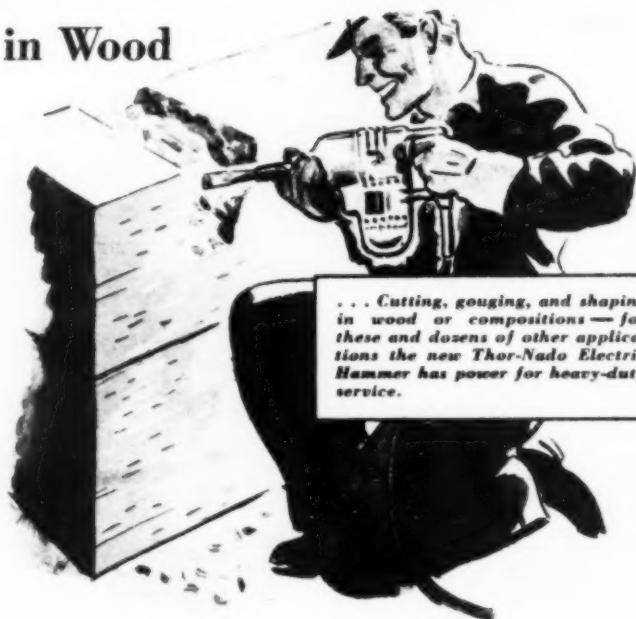
Dowmetal housing . . . strong yet light
Ball bearings sealed against dirt



in Metal

. . . Chipping and scaling to remove rust, paint, and weld splatter, scale and similar accumulations . . .

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● **IN THE NEW THOR-NADO** you have at last an electric hammer that *really* does the job! A hammer with a blow more powerful than any tool of comparable size and capacity. A hammer that will go to work for you in a hundred different ways — with results faster and better than ever before.

12 MONTHS OF GRUELLING TESTS have proved its mettle. 12 months . . . on the job in the field . . . in every section of the country. Its power and stamina are on the record!

TRY THE THOR-NADO on a job of your own. Make an actual demonstration and watch it come through with colors flying! Send the coupon for complete information or to order the Thor-Nado for 10 days Free Trial. Clip it now!

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SIZE NUMBER U-100
CAPACITY IN CONCRETE 1"
BLOWS PER MINUTE 1600
WEIGHT 14 lbs.
LENGTH OVERALL 13½"
UNIVERSAL MOTOR, 110 OR 220 VOLTS

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• The exclusive new "SLING-SHOT DRIVE" is a shock-proof rubber connection that drives the piston in a powerful hammer action. Back and forth it whips the piston . . . acting first as power accumulator . . . then as shock absorber on the recoil. There's no metal connection between the piston and the gear train and motor. And thus no shock to gear, motor, or the operator. Here's enormous power, easy to handle!

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☐ One U-100 Thor-Nado for 10 days *Free Trial*
(Check voltage desired ☐ 110 volts ☐ 220 volts)

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ADDRESS
CITY STATE.....

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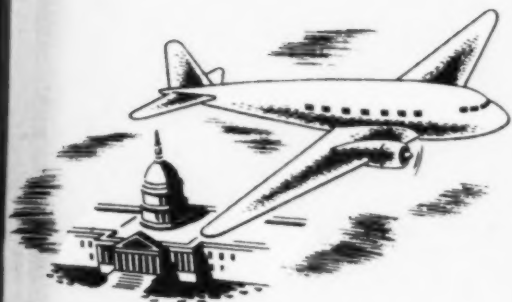
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AMERICA'S SECOND-LARGEST AIR TERMINAL



WET FILL—A fleet of "Caterpillar" Diesel D7 Tractors with LaPlant-Choate bulldozers leveling off wet fill for the Washington National Airport. This equipment keeps working 22½ hours a day.

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TRACK-TYPE TRACTORS • ROAD MACHINERY • DIESEL ENGINES AND ELECTRIC SETS



EIGHTEEN million yards of hydraulic fill, two million yards of dry — and with park-like beauty the new Washington National Airport will have reared virtually all of its 710 acres above the surface of the Potomac River!

"Caterpillar" Diesel equipment, quite naturally, is playing a vital part in the creation of this great enterprise — just as its presence on any large construction project is usually taken as a matter of course. . . . For the speed, work-volume, operating economy and rugged dependability of "Caterpillar" Diesel Tractors and Motor Graders give the contractor advantages for profit he can scarcely hope to equal with less efficient or less sturdily built equipment.

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INTERESTING FACTS

Washington National Airport covers 710 acres — mostly fill from Potomac River — with three sides having water frontage.

Runways dredged in about 6 feet above final leveled-off elevation.

Runways 150 to 200 feet wide, paved with two layers of bituminous mixture.

Three initial hangars; three more to be provided later.

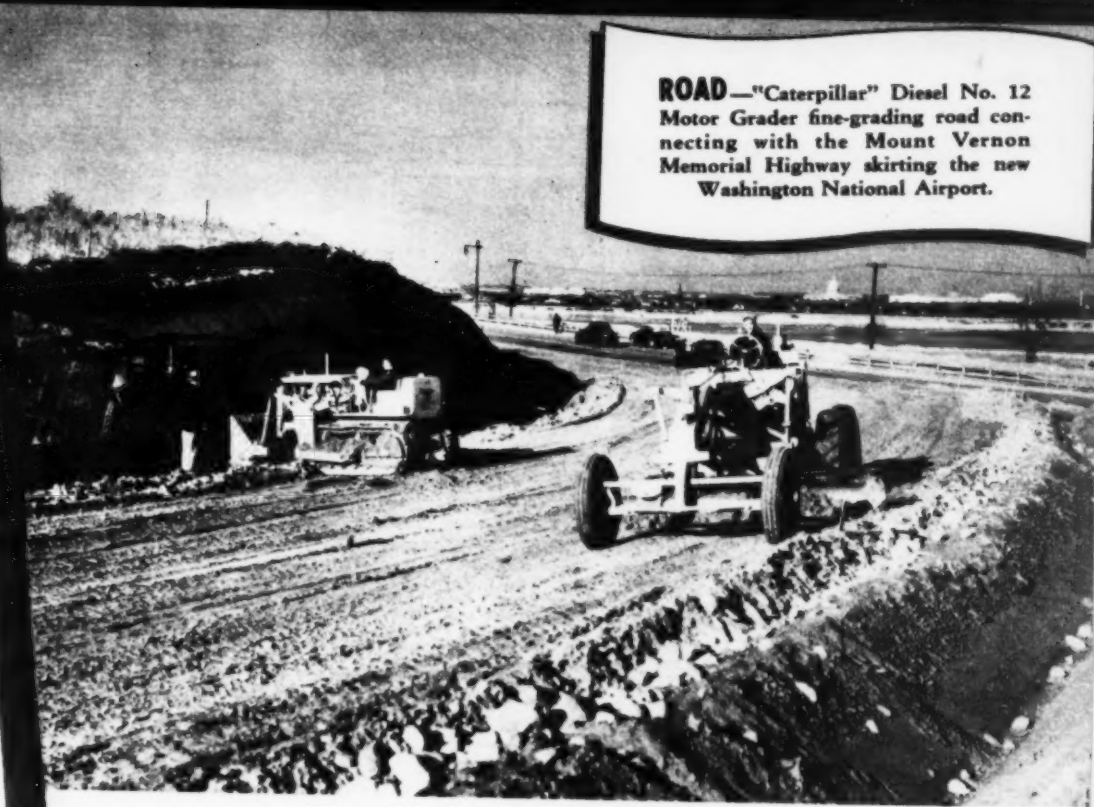
At opening, airport will serve three airlines; 130 schedules.

Landscaping will make part an "air park" — a part of the National Parks system.

Special observation parking spaces enable visitors to view entire field from their automobiles.

Seaplane base will be constructed immediately south, with necessary connections for vehicular and aircraft traffic.

ROAD—"Caterpillar" Diesel No. 12 Motor Grader fine-grading road connecting with the Mount Vernon Memorial Highway skirting the new Washington National Airport.



LEVEE—"Caterpillar" Diesel D7 Tractor with LaPlant-Chaste bulldozer building earth levee on Washington National Airport project. Uses about 2 gallons of 6½¢ fuel per hour.



DRY FILL—"Caterpillar" Diesel D8 Tractors with LeTourneau Carryall scrapers doing excavating and hauling work on Washington National Airport construction.





NO NURSING OF HAULING UNITS

JOB: Falls View Highway, West Virginia.
CONTRACTOR: T. C. Staples Construction Co.
EQUIPMENT: Two 16-yd. and four 14-yd. Athey
 Forged-Trak Side Dump Quarry
 Trailers and Four "Caterpillar"
 Diesel Tractors.

They're **MECHANIZED**
 with Athey
Forged-Trak Trailers



MOTORIZE

*as the army does with trucks, for speedy
 action on pavements or firm ground.*



MECHANIZE

*as the army does with tanks, for the tough
 going off-the-pavement.*

ATHEY

TRUSS WHEEL CO.

5631 W. 65th St., Chicago, Ill., U.S.A.

Cable Address: "Trusswheel," Chicago

ON the Falls View highway job down in West Virginia, the T. C. Staples Construction Company grew weary of nursing motorized hauling units with finely blasted rock and partial loads. So they "MECHANIZED" with Athey Forged-Trak Trailers pulled by "Caterpillar" Diesel Tractors to secure consistent capacity in shovel output. Now they shoot to break rock—not to shatter it—don't need to break it up as fine as when they're loading trucks—save drilling and blasting costs—and carry capacity loads.

The T. C. Staples Construction Company have two 16-yard and two tandem 14-yard quarry side dump trailers, each pulled by "Caterpillar" Diesel D-8 Tractors. This equipment provides consistent speed in hauling that, in spite of tough going, keeps the shovel swinging—operates in all kinds of weather. Road maintenance is kept at a minimum since Athey Forged-Trak Trailers lay a steel roadbed over the rock, clay, and mud encountered—climb right up over shovel spill—require little bull-doing to "clear the track." Athey Forged-Trak Trailers keep the fills in excellent condition—work right up to the edge; dump material where they want it. What's more, they save money in equipment maintenance—there are no tires damaged—no cantilever springs to break.

Find out how YOU can make more money by mechanizing with Athey Forged-Trak Trailers for off-the-pavement jobs. See your "Caterpillar" dealer or write us.

Announcing The **AMERICAN BOSCH MAGNETO TRADE-IN PLAN**

***LIBERAL TRADE-IN ALLOWANCE
ON YOUR PRESENT MAGNETO!***

WHY IT PAYS TO HAVE A MODERN MAGNETO

Here's why the modern American Bosch Super-Powered Magneto often cuts overhaul costs more than half, saves you money. Take advantage of the new American Bosch Magneto Trade-in Plan.



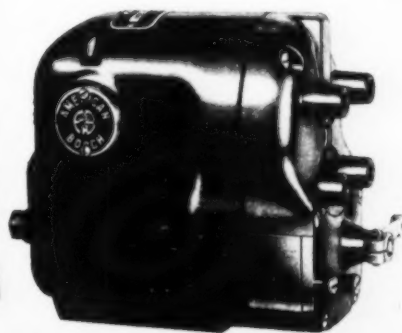
At left is a typical example of the expensive, commonly required replacement parts necessary in an old-style magneto. At right you see the fewer, sturdier, less expensive parts which accomplish the same function and make the modern Super-Powered American Bosch a better, more rugged, more dependable, more economical magneto.

***Are Your Magnetos Costing Too Much?
Maybe it's more ECONOMICAL TO
REPLACE than to REPAIR . . .
Examine the facts!***

Is it worthwhile to overhaul your old style magneto? Probably not, especially if major parts need replacement. For even when these parts have been replaced, it's still not a modern magneto!

Why not trade it in for a modern, up-to-the-minute super-powered American Bosch Magneto? Modern—the magnet is made of Alnico, amazing new magnet metal which has revolutionized magneto design. Modern—the American Bosch Super-Powered Magneto has fewer rotating parts, less expensive parts, much sturdier construction that often slashes upkeep costs 50% or more!

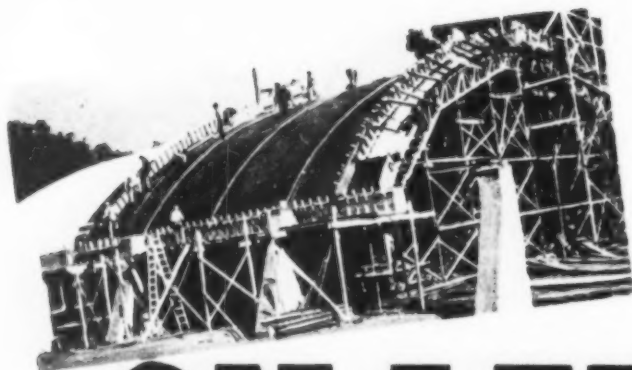
Why not enjoy the plus in performance, the minus in maintenance which is yours with the modern American Bosch Magneto? Why not take advantage today of our liberal trade-in plan? Any American Bosch service station will be glad to supply full details. Or write our factory for "A Message To Magneto Users."



AMERICAN BOSCH CORPORATION
Springfield, Massachusetts

The American Bosch Magneto Trade-In Plan is subject to change or withdrawal without notice.

AMERICAN BOSCH *Super Powered* **MAGNETO**



ON LARGE JOBS



ON SMALL JOBS

- ON JOBS of all types, contractors are re-use of forms. Reduces form costs. saving time and money by using quick-curing concrete made with PENN-DIXIE HIGH EARLY STRENGTH CEMENT. Facilitates maintaining construction schedules. Lowers overhead expenses. Permits earlier completion of entire job. Get the facts . . . write for booklet E-105 today.
- Allows earlier stripping . . . earlier

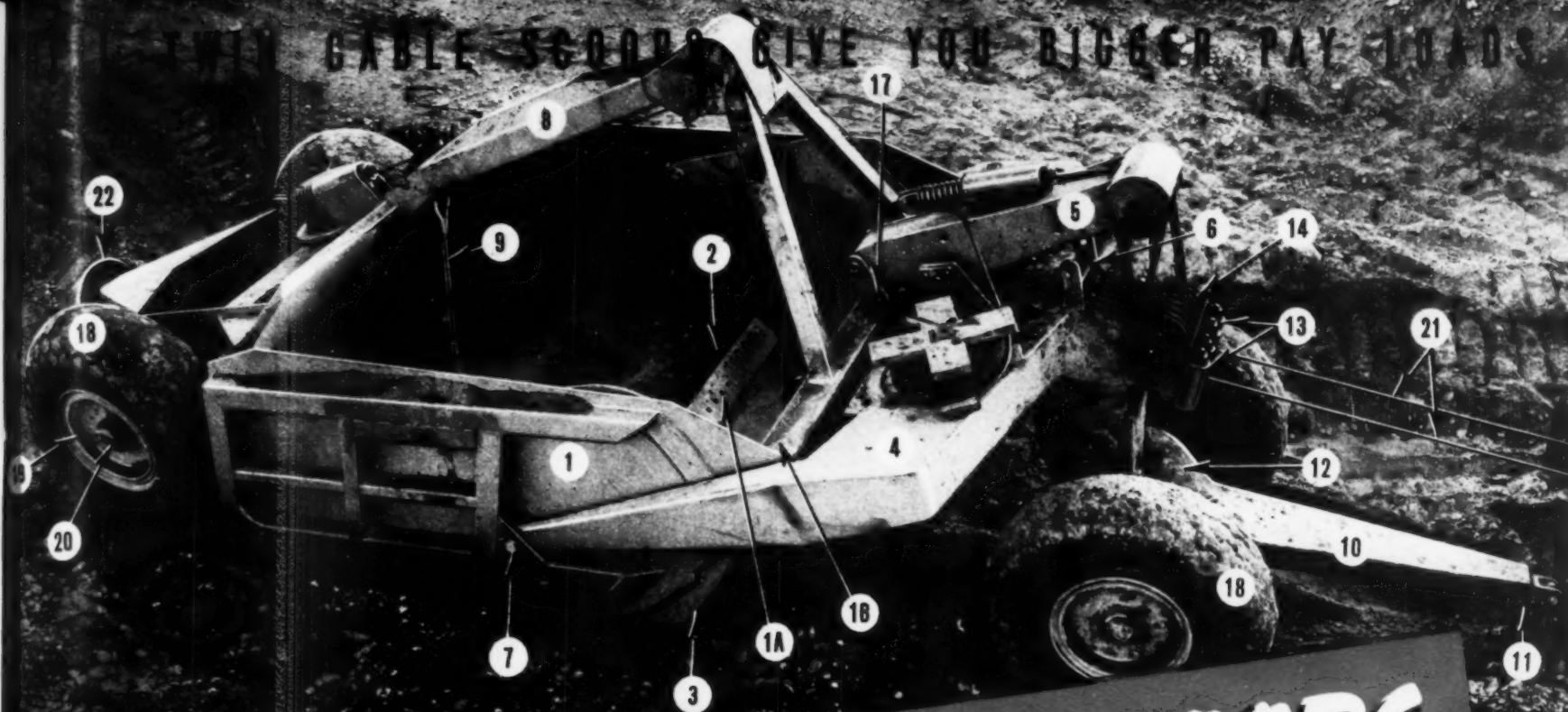
Pennsylvania-Dixie Cement Corporation, 60 East 42nd Street, New York, N. Y.
Boston • Rochester • Philadelphia • Atlanta • Des Moines • Chattanooga



PENN-DIXIE

HIGH EARLY STRENGTH AND REGULAR PORTLAND CEMENTS

TWIN CABLE SCOOPS GIVE YOU BIGGER PAY LOADS



HEIL DIG-N-CARRY SCOOPS *move dirt profitably*

HEIL QUALITY CONSTRUCTION FEATURES THAT INSURE LONG LIFE AND SATISFACTORY SERVICE

1. BOWL, MAIN FRAME, REAR AXLE ASSEMBLY . . . one, sturdy, compact, rigid structure.
- 1a. CUTTING BLADE BED . . . a heavy trussed structure, permanently and rigidly welded to bottom of bowl.
- 1b. BOX SECTION CROSS FRAME . . . extremely heavy . . . welded to sides of bowl at upper front making a complete box section and holding bowl in perfect alignment.
2. TILTING FLOOR . . . hinged immediately above top of cutting blade. Reinforced with a heavy box section torsional member across the back and with a series of longitudinal box section members.
3. FRONT APRON . . . strongly reinforced. High arched side arms hinged high up inside of bowl. Minimum dirt resistance assures easy closing action. Front apron provides extra wide opening for quick unloading action.
4. LIFT FRAME AND POST ASSEMBLY . . . Box-Beam construction . . . reinforced to resist maximum draw-bar pull.
5. BOWL LIFT BEAM ASSEMBLY . . . strongly reinforced. Heavy box section construction.
6. BOWL LIFTING BEAM STOP . . . can also be used as hauling position anchor for transporting scoop as trailer.

7. DRAFT PIVOT HINGE POINT . . . heavy duty . . . located back of and above cutting blade.
8. UNLOADING CARRIAGE TRACK . . . rigidly welded to bowl at front and rear.
9. DISCHARGE LEVER ARM . . . hinged to tilting floor. Supported by roller shaft and sheave assembly at its upper end.
10. HEAVY DUTY BOX-BEAM TONGUE and FRONT AXLE ASSEMBLY.
11. DRAW-BAR CUSHION SPRING.
12. HEAVY DUTY UNIVERSAL SWIVEL.
13. CABLE GUIDE ROLLERS . . . heat treated and fitted with renewable bronze bushings.
14. SHEAVES . . . 8" and 10" diameter sheaves, all located high above dirt line. Equipped with large, bronze or roller bearings.
17. BOWL LIFTING AND DISCHARGE ACTION . . . imposes relatively low "line-pull" on actuating cables.
18. TIRES . . . single, large diameter, heavy duty, earth mover tires are standard equipment. Tires are outside of rear frame allowing ample clearance to prevent tire damage.
19. WHEELS . . . heavy duty with large diameter axles and roller bearings. Rear wheel tread comes within the cutting width of scoop.
20. ONE REAR AXLE ECCENTRIC . . . provides for horizontal blade adjustment or setting.
21. CABLE LENGTHS . . . unusually short lengths are required.
22. SPRING CUSHIONED BUMPER . . . available at extra cost.

Thoroughly field tested over a period of months, Heil Twin-Cable Scoops have proved their efficiency and dependability on various dirt-moving projects. Here, truly, is equipment that dirt-moving experts will be quick to acclaim the most advanced of its kind in the field . . . Now is the time to investigate . . . Send today for your free copy of bulletin RM 350.



THE HEIL CO.

MILWAUKEE, WISCONSIN

HILLSIDE, NEW JERSEY

MANUFACTURERS OF CABLE SCOOPS • TRAIL BUILDERS • HYDRAULIC
SCOOPS • BULLDOZERS • TWO WHEEL SCOOPS • DUMP UNITS

Long Live BEARINGS!

Three ways to help: consider the effect on your oils of **LOAD**, of **HEAT**, of **CONTAMINANTS**

LET'S LOOK at bearing lubrication through the eyes of your plant engineer—a highly practical person. He usually does little talking about lubrication theories. He sees lubrication as one of the important means to the end he's after . . . which is to give you all the operating efficiency your machines can deliver at the lowest cost.

But he's thinking always of your actual machines—some of which have to work under abnormal conditions. Does it pay you to run one of them at a fairly consistent overload? Very well; he'll just have to adjust his lubricant to that overload. Perhaps another one has to inhale a lot of sulphur; a third works in atmosphere choked with dust. He'll just allow for those contaminants in figuring what oil best does the job, and how best to purify it.

Among the many conditions he deals with, in choosing and controlling his lubricants, he's certain to lay emphasis on these three: operating loads; range of bearing temperatures; extent and kind of contamination.

The Load on a Bearing

The job of a bearing lubricant, stated simply, is, of course, to form an oil film that keeps the metal of the journal from touching metal of the bearing. It's always easy enough to agree on basic theories.

But let's suppose that in one of your bearings you've figured on a normal unit of pressure of 500 lbs. per sq. in. Under that load the oil you're using maintains a perfect oil-wedge formation, like that in Fig. 3 above. Later, it happens to make sense for other reasons to throw an extra 200-lb. load on that bearing. As the journal is pulled downward, the oil film on the pressure side becomes thinner . . . and thinner. Does it reach the danger point? That depends on what adjustments your engineer has made in his oil.



SHELL Industrial Lubricants

How Much Heat?

Yet he can never deal with this problem in isolation. He must at the same time keep in mind the bearing temperature. Temperature, as you know, acts upon oil viscosity both as cause and effect. Is viscosity too low? The oil may be squeezed out—result: metal-to-metal friction—and up goes the heat. Yet too heavy an oil sets up excess fluid friction, generating and holding heat: bad first for the oil; soon after, hard on the bearing.

Here, too, your engineer gets the effective lubricant only by considering in each of your bearings *all* the factors that may alter the temperature.

Three Stages in the Formation of the Oil Wedge

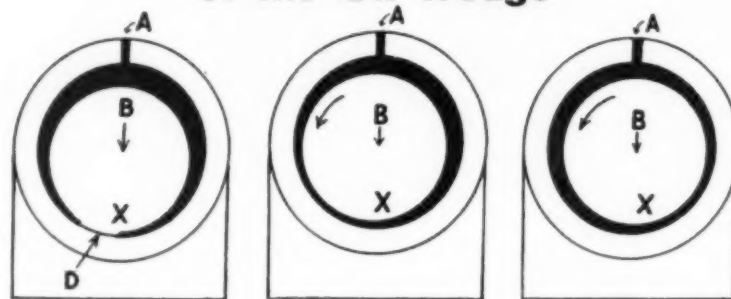


Figure 1
Journal (X) at rest. Metal-to-metal contact and high-pressure point at (D). Load (B) vertical. Lubricant-introduction point at (A).

Figure 2
Journal (X) starting in motion. Oil film and wedge create high-pressure point where metal-to-metal contact existed in Fig. 1.

Figure 3
Journal at full speed. High-pressure point has moved to the right following direction of journal motion and pressure of oil wedge.

Contamination—and Control

Then there's the question of contaminants of all kinds. Your engineer never forgets the active agents that set busily to work on a fresh lubricant as soon as it's in. He has to know where oxidation may occur with each lubricant. He knows when the resulting sludge is apt to fill up oil grooves or clog feed lines.

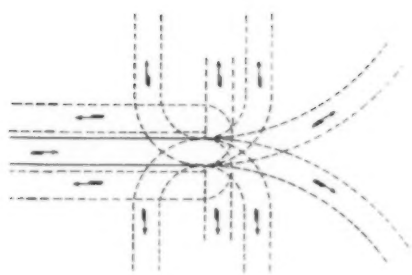
At least, he knows all these things to watch for, and many others, too, if he's going to insure your bearings the care that they deserve. Shell has often helped, from its years of experience in a variety of bearing problems, to supply the one or two clues which may be all you need to improve your bearing operation or to lower your operating costs. Call in your Shell lubrication man. You and he have the same end in view . . . longer life for bearings.



One-man STEERING TRACTION CONTROL

● All operations including steering and traction are controlled by the operator from his seat in the cab. Only two gears are required for the lower traction drive. These are enclosed in a dirt-tight case and run in oil. Two multiple jaw clutches, operating independently connect the driving shaft with the crawlers. Either crawler can be partially or wholly locked for steering. Both can be locked against traction.

KOEHRING CO • Milwaukee, Wis.



Steering in any direction and in varying radii is possible because each crawler is independently controlled by the operator from his seat in cab.



Koehring traction shaft operation for traction and steering controlled by the operator from the cab.



HEAVY-DUTY CONSTRUCTION EQUIPMENT

Sears' smart new stores are all **PLYFORM** jobs!

Plywood gives smooth, flawless surfaces at lower cost!

● Sears, Roebuck & Co.—like scores of other outstanding businesses, architects, contractors and engineers throughout the country—are standardizing on Plyform for all exterior concrete form work. Sears used Plyform first in Los Angeles several years ago. Results were so satisfactory and costs so low that Plyform was specified for all new buildings, including those in Chicago, Ill., Baltimore, Md. and Highland Park, Mich.

Plyform is unsurpassed concrete form material. It comes in big, strong, easily-handled panels. It works easily and quickly . . . can be nailed without boring holes. It minimizes joints and fins . . . saves up to 12c a square foot on rubbing and finishing costs alone. If handled with reasonable care, Plyform can be re-used over and over again, saving time and money.

1. Plyform serves as sheathing and lining combined!
2. Every panel is sanded satin-smooth and oil-treated at mill!
3. For instant identification and easy specification, Plyform panels are edge-sealed in distinctive silver-green and stamped with a diamond-shaped "grade trade-mark"!
4. Manufactured with special highly water-resistant premium glues in strict accordance with U. S. Commercial Standard CS45-38.

Specify Plyform on your next job. It's handled in a variety of thicknesses by all recognized lumber dealers. For technical booklet, write Douglas Fir Plywood Association, Tacoma Building, Tacoma, Washington.



These stunning Sears, Roebuck & Co. buildings were designed by Nimmons, Carr & Wright. Martin Schwab, consulting engineer.



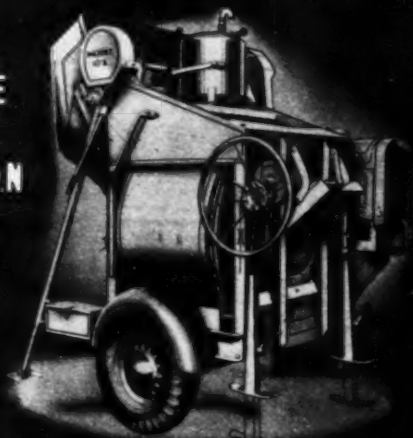
You can quickly identify Plyform by its distinctive silver-green edge seal and by this diamond-shaped "grade trade-mark."

NOW YOU CAN GET A 1940 MODEL JAEGER

with
**AUTOMOTIVE
TYPE
TRANSMISSION**

and MACHINED
STEEL DRUM
TRACKS

30 - TO 40 - MORE
EFFICIENT — 90%
LESS NOISE — YEARS
LONGER LIFE



55-75-105-145 Alike in All But Size

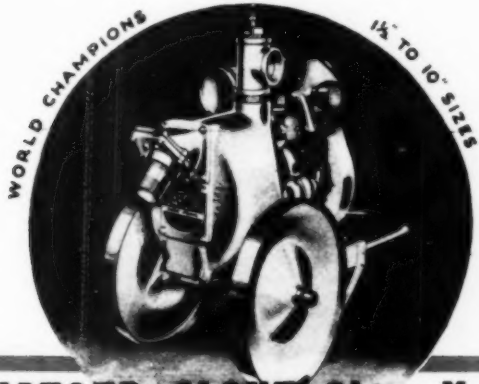


Full End Discharge
with Measuring Batch
Hopper Weighs 30% to
40% More

They're light, they're fast, they're portable — yet they'll out-mix and out-last any heavy duty mixer you ever owned.

Gears run in oil, enclosed from dirt and weather — all shafts ball bearing. Machined steel drum tracks, chilled, ground rollers. Send for new Catalog, prices. **THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus, Ohio.**

1940 SPEEDLINE MIXERS



JAEGER, ALONE, Gives You All These Pumping Features

- JAEGER "PRIMING JET"—Up to 5 times faster priming and re-priming—often means difference between profit and loss on job. No adjustments—no need to "gun" engine.
- POSITIVE RECIRCULATION CUT-OFF—It's controlled by flow, not pressure.
- "FULL-RANGE" IMPELLER gives high efficiency under all conditions (built of steel in 4" to 8" sizes).
- ACCESSIBLE SEAL—always outlasts the impeller.
- PATENTED SELF-CLEANING SHELL—scours while pumping, won't clog, easily accessible.
- DEPENDABLE, LONGER LIFE CONSTRUCTION—thousands of EXTRA hours of service.
- EVERY PUMP INDIVIDUALLY TESTED for capacity and pressure before it leaves our factory.

**OUTSELLS EVERY
OTHER PUMP**

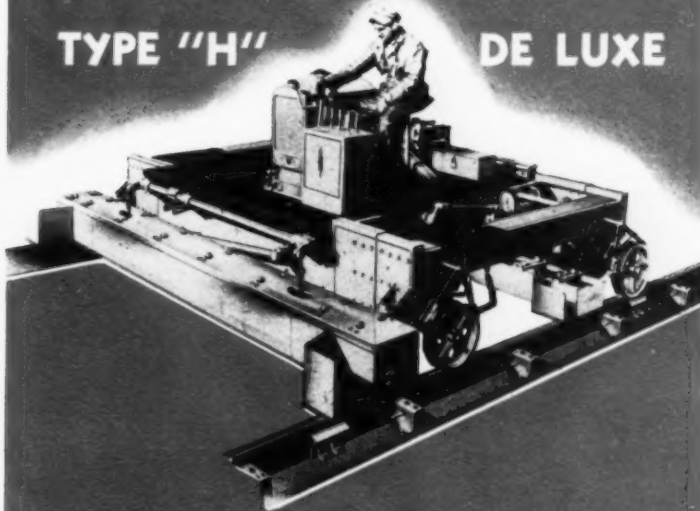
Send for New Catalog and Prices
THE JAEGER MACHINE CO.
800 Dublin Avenue - Columbus, Ohio

JAEGER "Sure Prime" PUMPS

JAEGER Announces this Finer, Faster FINISHER

TYPE "H"

DE LUXE

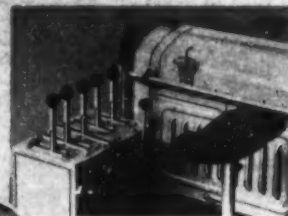
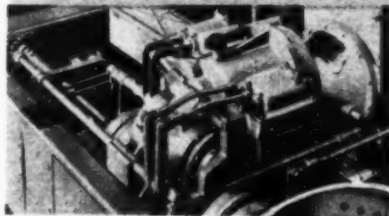


NEW SPEED AND TRACTION to match 34E Dual Drum Pavers and Jaeger Screw Spreaders on dry mixes. 4-Speed Automotive Transmission has working speeds to 18 F.P.M., positive drive to 4 equally loaded wheels.

NEW SMOOTHNESS OF FINISH with rigid, fully enclosed, spring loaded 12" screeds, independently controlled.

COMPLETE CONTROL—all levers banked in front of operator, including separate screed and traction speeds, fast hydraulic power lift for each screed.

GREATER TELESCOPIC WIDTH CHANGES—Central unit and side trucks completely self-contained. Quickly extend Telescopic Frame and insert Screed Sections for built-in width changes; merely insert wider cross members and screeds for widths to 30 ft. Merely move wheels for 1/4" to 3" adjustments.

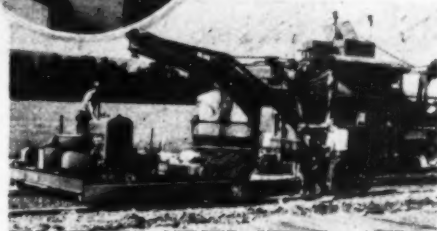


One Heavy Duty Central Transmission, direct connected to Engine, performs all functions.

Double Row Crown Adjustment standard. One Lever operates Improved Quick Crown Change Screed.

Throttle, Engine Clutch, Steering, Forward-Reverse, 3 Screed Speeds, 4 Traction Speeds and Screed Lifts—all banked for operator.

JAEGER SCREW SPREADERS—a necessity with Dual Drum Pavers. Re-Mix, spread and strike-off fast as Paver can produce, densify the slab, speed production, cut costs. Over twenty now in use on Pennsylvania Turnpike.



New Bulletin SF-40 Gives Full Details—Write Today.

THE JAEGER MACHINE COMPANY
800 Dublin Avenue, Columbus, Ohio

From the approved hot rolled wire rods through Macwhyte's furnaces, cleaning, baking, cold drawing of wire, and fabrication of wire into wire rope—at every step of the way Macwhyte PREformed Wire Rope is made to make good. Ask for a Macwhyte Wire Rope Recommendation.

FROM ROD TO REEL



**LABORATORY TESTED
FIELD PROVED**

*with the Internal
lubrication*

When you ask the man who's used it, he'll tell you, "Macwhyte Wire Rope has saved us a good many rope dollars."

A Macwhyte recommendation may save you a good many rope dollars too! Our engineers are always at your service, why not tell them your problems?

... Macwhyte stocks are conveniently located so that you get **WHAT** you want **WHEN** you want it. For low cost operation, buy **MACWHYTE PREformed**.

*Every
inch*
**MADE TO
MAKE GOOD**

**MACWHYTE
COMPANY**

KENOSHA, WISCONSIN

New York .. Pittsburgh .. Chicago .. Ft. Worth
.. Portland .. Seattle .. San Francisco
(With distributors throughout the U. S. A.)
"Manufacturers of wire rope and braided
wire rope slings for every use."



"MORE YARDS PER HOUR Than Any Other Shovel"

Working in rough stratified shale and rock with this P&H Model 855, the cost of loading was only 8.45 cents per yard, as compared to 9.85 cents for other shovels, on the same job. It's easier to work with a P&H than to let one work against you.

P&H

EXCAVATORS

P&H excavators are built in 18 different sizes, from $\frac{3}{8}$ to 5 cubic yards capacity—gasoline, Diesel or electric power. Literature is available on all models.

4494 West National Avenue, Milwaukee, Wisconsin

HARNISCHFEGER

CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS



HOISTS • WELDING ELECTRODES • MOTORS

HERMAN HOLMES
General Contractor

Harnischfeger Corporation
Milwaukee, Wis.

Bedford, Penna.,
January 4, 1940

Gentlemen:

Attention of R.E. Young

Now that my job on the Pennsylvania Turnpike Commission is nearing completion I am able to make a comparison of the different equipment used on it and I am happy to advise you that the two yard P. & H. Model 855 Shovel has been outstanding both as to yardage moved and cost per yard of moving it.

This job consisted of moving well over one and a half million yards of rock and dirt in about four months time. The dirt and part of the rock was moved with scrapers leaving only the toughest rock for the shovels. Due to its greater power and rugged construction the Model 855 was given the hardest cuts on the job and handled more yardage per hour than any other shovel we had.

In spite of this hard work your shovel came through in fine shape and with very little delay. I hereby authorize you to use this as my recommendation of your machine to anyone who has a hard job of digging to do.

Yours very truly,

Herman Holmes
Herman Holmes

IN THE KENTUCKY STONE



COMPANY PLANT

TELSMITH GYRASPHERE

produces 120 tons per
hour of minus 1½" stone!

Wide experience . . . gained in operating ten quarries in Kentucky . . . has made the Kentucky Stone Company of Louisville very critical of quarry plant equipment.

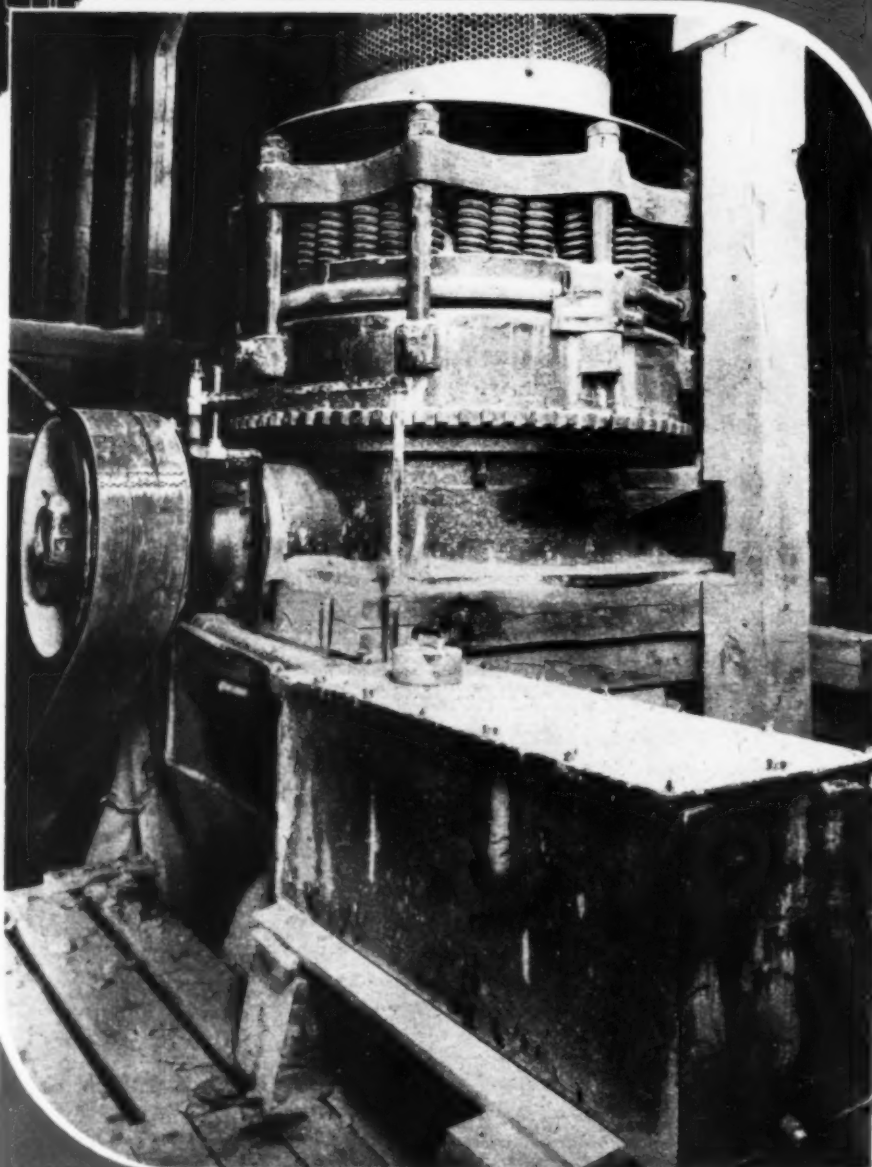
For their Tyrone Plant* they selected this No. 48 Telsmith Gyrasphere because they wanted to get finer crushing, a wider range of sizes as well as greater tonnage. Are they getting it? *They are.*

120 tons an hour of 1½" and down!

And the Gyrasphere would do better still, if the primary breaker, and the two vertical skips that hoist the rock from where it is mined underground, could dish it up any faster. With its unregulated choke feed this Gyrasphere sure can take it—and handle it—with less trouble, less power and less up-keep.

And why not—it's a rugged, high-speed, super secondary crusher—with every modern feature of design. Spherical head! Double wedge crushing action! Roller thrust bearings! Spring relief! Effective sealing and lubrication! Furnished with interchangeable coarse or fine crushing concaves, you can get the sizes you want—1½" to ¾", or ¾" to ⅛". And you'll get better, more cubical aggregate, too. *Bulletin Y-10* tells you why and how. *Get one.*

* Plants at Irvington and at Russellville have also been modernized with Telsmith crushing and screening equipment.



TELSMITH

SMITH ENGINEERING WORKS
510 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

30 Church St.
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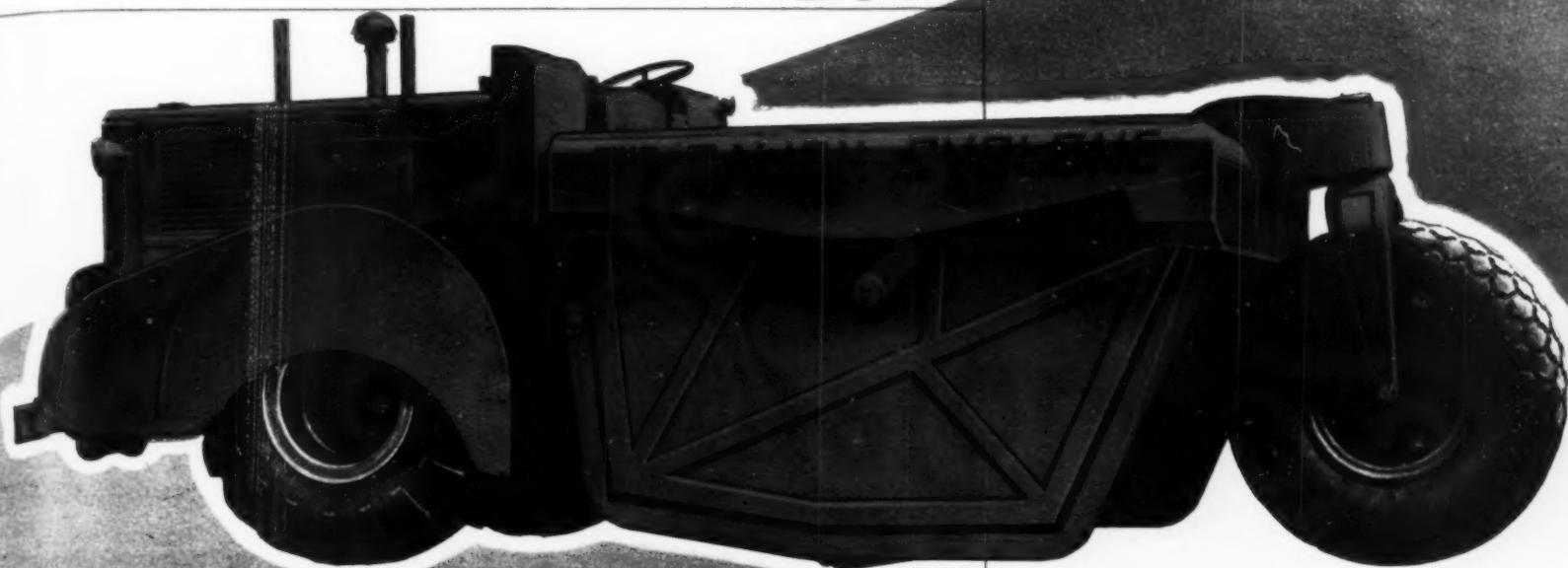
Canadian Vickers, Limited, Montreal

Gordon Russell, Ltd., Vancouver

Y-2-40

NEW HIGH SPEED EARTH MOVER

15-YARD CAPACITY



REDUCES EQUIPMENT INVESTMENT

Offering many advanced features in design, operation and performance...the Galion Cyclone motorized unit brings a new speed, efficiency and economy to dirt moving on construction projects. Besides reducing initial equipment investment, it provides a new low cost per yard on the Short Hauls and greater savings on the Long Hauls.

With the aid of a pusher tractor when digging, power and speed at the cutting edge are doubled. Thus 100% greater yardage is loaded in half the time otherwise required. Gravity dump combined with positive ejection of the dirt speeds dumping and spreading operations.

The Cyclone, powered with a high-speed 6-cylinder diesel engine of 100 H.P., has a quick getaway and fast roadability...up to 25 miles per hour...plus a short turning radius of 15 feet, reducing hauling time to a new low.

This new Galion Cyclone will give you the super performance that extends profitable hauling distances hundreds of feet. Its wide adaptability warrants your investigation. Let us tell you more about the Cyclone and what it can do for you.

THE GALION IRON WORKS & MFG. CO.

MAIN OFFICE & WORKS: GALION, OHIO

Check ✓ These Proved Features:

- Rear Drive with a full Diesel engine over axle. 8 forward speeds—2 reverse. 1 to 25 miles per hour.
- Tri-wheel Chassis—Scientific weight distribution. Rear wheels powered for greater flotation and traction.
- High Power Gross Load Ratio for mobility and high traveling speed up steep grades and over soft fills.
- A Flat Angle, self-sharpening cutting edge with moldboard to raise material up and forward onto carrier gate.
- High Bowl Sides with power-closing carrier gate prevents spill on fast haul roads, thus reducing maintenance.
- Fast Gravity Discharge with positive ejector of the shaker type for accurate and rapid spreading of material.
- A Large Top Opening without exposed hydraulic cylinders, cables and upper structure for fast loading with shovel or dragline.
- Conventional Automotive Control—steering, clutch and brakes air-powered to reduce operator fatigue.
- Shuttles back and forth on short hauls, bulldozes material, fine grades fills, picks up surplus, maintains own haul road.
- With pusher tractor, power and speed at cutting edge are doubled thus double the yardage is loaded in half the time.

DIGS



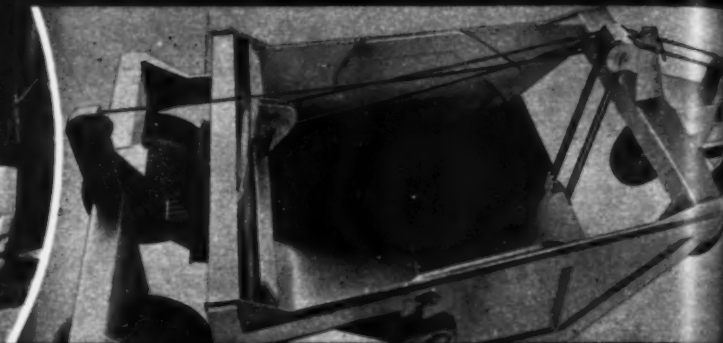
CARRIES



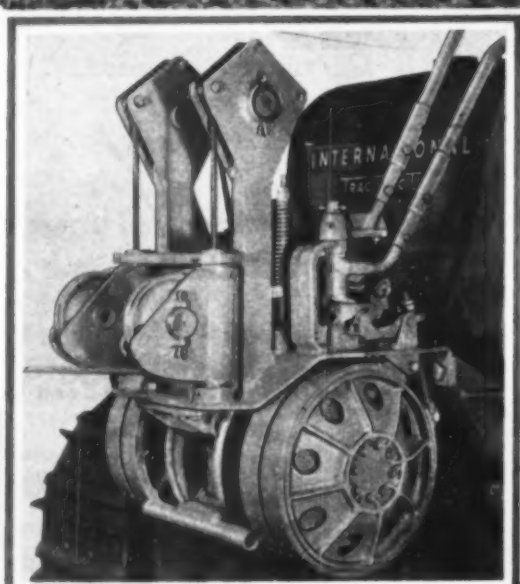
SPREADS



with everything



You'll get long life from cable because it is free of twisting bends. All sheaves are in a single plane with no cross-carry of cable.



New Bucyrus-Erie planetary-type Power Control Units for use with the new Bucyrus-Erie four-wheel Scrapers. These units are available in double and single-drum models and can be used wherever cable control-units are required.

new

BUCYRUS-ERIE

4-Wheel SCRAPERS



**BUCYRUS
ERIE**

you've always wanted!



You'll get low maintenance. For instance, all sheaves operate on roller bearings and are interchangeable.

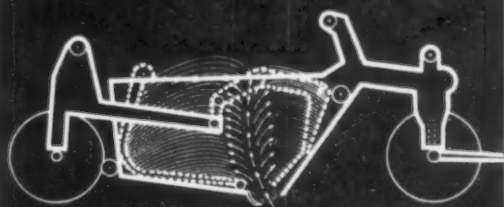


You'll be able to dig and dump on side slopes because of the low center of gravity.

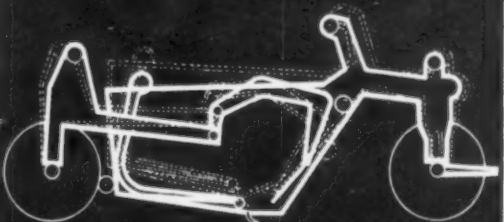


You'll save a lot of time on every trip with the short non-stop turning radius.

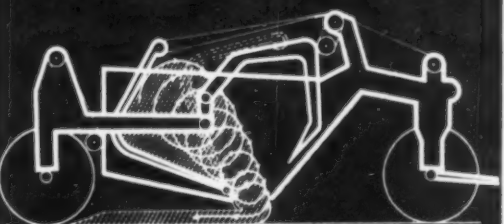
BUCYRUS-ERIE announces a new 1940 line of 4-wheel scrapers in a complete range of sizes. Engineered for use with the new line of International TracTracTors, these scrapers have everything you've always wanted: *two-line cable control* that gives accurate control of spreading — *double-curve cutting edges* giving the boiling action that heaps loads easily — *low center of gravity* with plenty of stability for digging and unloading on side slopes — *constant wheelbase*, distributing the load evenly on all tires for easy hauling and faster cycles — *positive rolling ejection* that gives clean dumping in all kinds of material — *only five main parts* for ease of handling and low maintenance, easy simple action for faster cycles and low tractor operating costs. Find out all about these new units from your nearest International TracTracTor Dealer.



You'll get heaping loads, quick, with the boiling action from the double-curve cutting edge.



You'll get even distribution of load and faster hauling because of the constant wheelbase.



You'll get controlled depth of spread and clean dumping due to positive rolling ejection.

Bucyrus · Erie
S O U T H M I L W A U K E E , W I S C O N S I N

International FOUR NEW POWER

Feature Facts About International Diesels

1. Full Diesel engine with full Diesel fuel economy.
2. Easy to install, simple to operate.
3. Basic parts can be attached or detached for a wide variety of equipment combinations.
4. Quick, easy starting.
5. Governor and extra-large fly-wheel maintain any engine speed desired, up to maximum governed r.p.m.
6. Long-lived, heat-treated alloy cylinders—replaceable.
7. Tocco-hardened crankshaft with precision-type, replaceable main and connecting-rod bearings.
8. Full-pressure lubrication thru drilled passages.
9. Completely sealed to keep oil in and dirt out.
10. Efficient cooling system with thermostatic by-pass control.

INTERNATIONAL HARVESTER scores another success in the Diesel field with **FOUR NEW DIESEL POWER UNITS**. Here is *smooth, economical Diesel Power in compact, convenient form—easily installed, simple to operate*—ready to solve your power problems and cut your power costs. These engines range in size up to the UD-18, rated 100 h.p. at 1,400 r.p.m.

This good news for all users of power follows the introduction of International's **FOUR Diesel TracTractors** for 1940. Now you can get International *diesel design, quality, performance*—and International *full DIESEL fuel economy*—in *various sizes* of power units and crawler tractors . . . making it more profitable than ever to standardize on this famous line and enjoy all the advantages only Harvester can provide.

International Diesels operate on small quantities of low-priced fuel. With International's starting system, they are *ready to go*—no delay or loss of time getting started on the job. They are engineered in every detail for *economy of operation, economy of maintenance, and long heavy-duty service*. Each one is ruggedly built for the toughest working conditions.

Whatever your power needs, investigate this new line of International Diesel Power Units. The nearby International industrial power dealer or Company-owned branch will give you complete information. The International line also includes power units for gasoline, gas, and distillate operation.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)

180 North Michigan Avenue Chicago, Illinois



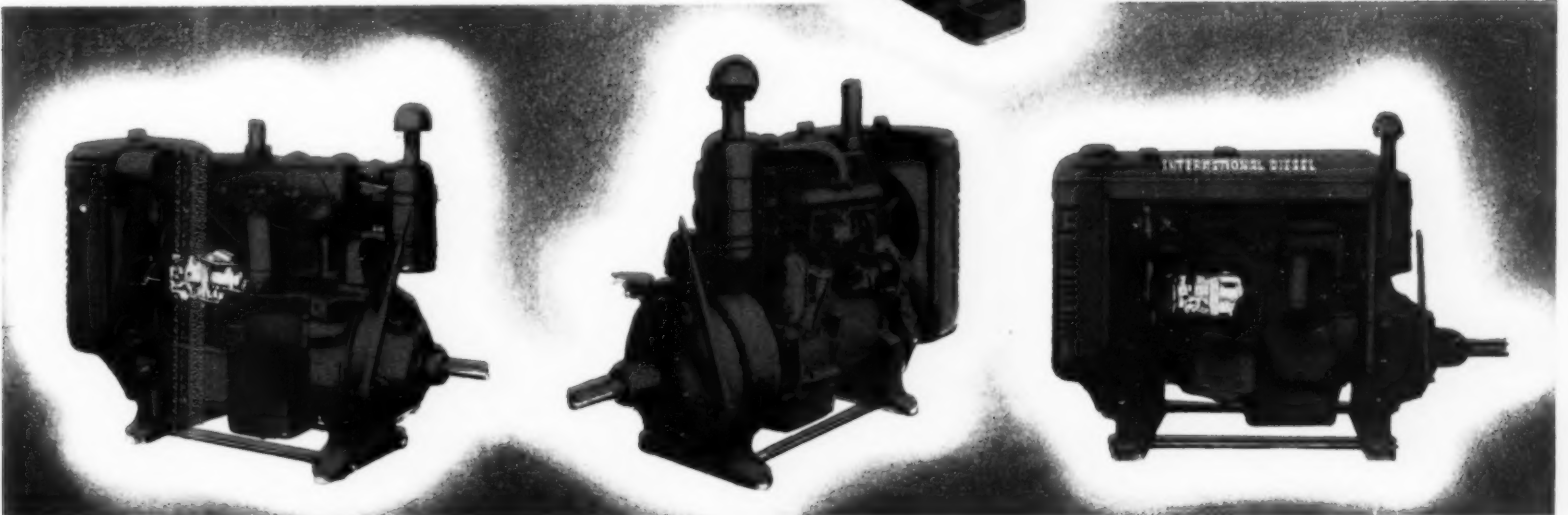
Here is International's line of **FOUR Diesel TracTractors**—biggest news of the year in the crawler-tractor field. This rugged quartet of streamlined crawlers—TD-18, TD-14, TD-9,

and TD-6—will show you new standards of Diesel performance and economy, plus perfectly designed balanced power in capacities to meet every demand of crawler-tractor users.

Harvester's DIESEL UNITS

International Diesel Power Units are easily adapted to a wide variety of uses. Basic parts can be attached or detached without interfering with other parts, making possible many equipment combinations to meet individual needs.

Right: The big 6-cylinder International UD-18 Diesel—100 h.p. at 1,400 r.p.m.—is a money maker, no matter how you figure. Where peak loads require additional power, one or more Internationals can be installed and cut in or out as the power needs vary.



Above: Here is International Harvester's small Diesel, the UD-6 (shown equipped for indoor use). This 4-cylinder engine packs a lot of power for its size and has the stamina to stand up under the toughest kind of operating conditions.

Above: The UD-9 Power Unit (shown here without engine head) meets the demand of users for a medium-small International Diesel. Its low-cost power can be applied in many different ways to effect important savings and step up efficiency.

Above: The International UD-14, medium-large Diesel Power Unit, is a popular size for powering a great variety of equipment and operating as an individual power plant. Put this engine to work and you'll find it a dividend payer.

INTERNATIONAL Industrial Power

Sturdy Walls of Steel

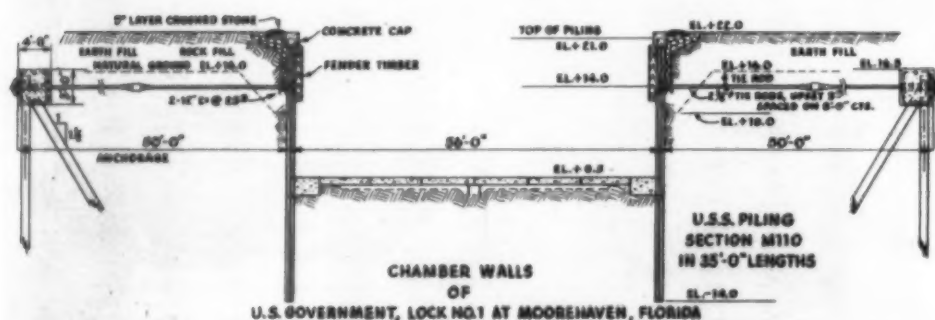
safeguard this Lake Okeechobee Lock

SIMPLE, EFFICIENT CONSTRUCTION WITH U-S-S STEEL SHEET PILING PROTECTS FLORIDA'S CROSS-COUNTRY WATERWAY



COMPLETED. Moore Haven Lock No. 1—Lake Okeechobee Drainage Area Project—looking north towards lake, showing upper or hurricane gate partly open, lower gate closed. Designed and supervised by Corps of Engineers, U. S. Army, Jacksonville, Florida. Contractor—E. H. Latham Company, West Palm Beach.

CROSS-SECTION OF LOCK CHAMBER. Showing typical detail of lock chamber construction. U-S-S Steel Sheet Piling M-110, 35 ft. long is driven to extend 14 ft. below the level of the lock floor. Anchor system consists of 2 1/4" tie rods, 50 ft. long, placed on the waterline, set on 8 ft. centers, and anchored to wooden anchor and batter piles, the upper ends of which are set in a 4' x 5' reinforced concrete cap as shown. In the lock chamber 12" x 12" fender timbers protect the face of the steel sheet piling.



THE Moore Haven Lock No. 1 on the Caloosahatchee River, Florida, is an important part of the U. S. Government project for providing a navigation channel at least 6 ft. deep and 80 ft. wide from the Atlantic Ocean to the Gulf of Mexico at Fort Meyers.

In this control structure, a combined hurricane gate and lock, the lock chamber proper is 50 ft. wide and 250 ft. long. To simplify the construction of the lock chamber and cut-off walls, some 800 tons of U-S-S Steel Sheet Piling were used; Section M-110, 35 feet long, in the lock walls and Section M-115, 20 feet long, in cut-off walls.

U-S-S Steel Sheet Piling was used here for the same good reasons that have led to its selection in so many other Florida projects and elsewhere—great strength, long life, low cost of installation, low expense for maintenance. Assembled in small units, it forms a wall that is water-tight and *continuous*—a sturdy barrier, strong to keep water in its place, free from marine borer attack and attractive in appearance as well.

Available in straight-web, arch-web and in the new "Z" sections, U-S-S Steel Sheet Piling is a rugged, lasting product. A *finished* product as shipped—ready to be handled and driven under the most difficult conditions of soil, water and surf. In breakwaters, bulkheads, seawalls, revetments, jetties, and groins, it provides ideal and economical protection against waves and tempest, against drifting and abrading sand. We welcome the opportunity of discussing its possibilities with you.



STEEL SHEET PILING

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, Pacific Coast Distributors

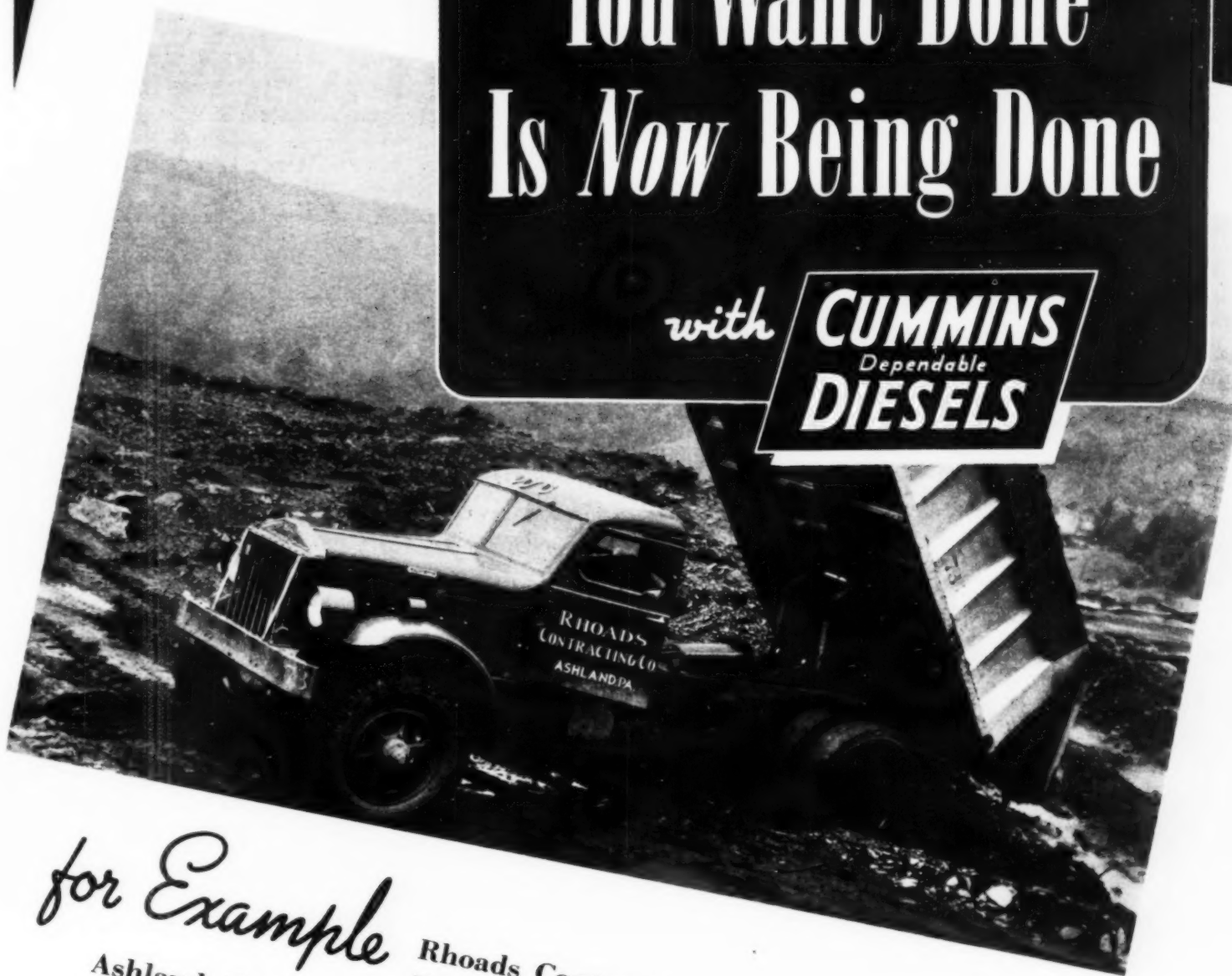
United States Steel Export Company, New York

UNITED STATES STEEL

The Job You Want Done Is *Now* Being Done

with

CUMMINS
Dependable
DIESELS



for Example

Rhodes Contracting Company work 6 Cummins Diesel-powered trucks in their coal strippings at Ashland, Pa. Over 5 to 10% grades, 13 yard loads are carried on round trip hauls of only one to three miles. Fuel consumption 1.2 gallons per hour . . . less than half the cost of former gas-powered trucks which carried only 6 to 7 yard loads.

Another demonstration of the extra profit you can earn with Cummins Diesel power. Ask for facts and figures on a job you want done. Cummins Engine Company, 3616 Wilson Street, Columbus, Indiana.

**"Dagnabbit! this
HAMILTON DIESEL
wouldn't show wear!"**



**Order from Your Nearest
Distributor as Listed Below:**

IN THE UNITED STATES

RPM DELO:

The California Company (Montana only)
Humble Oil & Refining Company
Standard Oil Company (Indiana)
Standard Oil Company (Nebraska)
Standard Oil Company of California
Standard Oil Company of Texas
Utah Oil Refining Company

Dial RPM DELO:

The Carter Oil Company, Tulsa, Oklahoma
Colonial Beacon Oil Company
Standard Oil Company of Louisiana
Standard Oil Company of New Jersey
Standard Oil Company of Pennsylvania

Kyso RPM DELO:

Standard Oil Company (Inc. in Kentucky)

Signal RPM DELO:

Signal Oil Company

Sohio RPM DELO:

The Standard Oil Company (Ohio)

IN CANADA & NEWFOUNDLAND

Imperial RPM DELO:

Imperial Oil Limited

IN BRITISH COLUMBIA & ALBERTA

RPM DELO:

Standard Oil Company of
British Columbia Limited

THROUGHOUT THE WORLD

RPM DELO is available through dis-
tributors in more than 100 countries.

It takes a thoroughbred engine and a stubborn, pigheaded, stay-in-there-and-pitch lubricating oil to defy old man "Wear Rate". But that's just what happened when New RPM DELO teamed up with a Hamilton Diesel in recent "exhaustive tests"!

After running at full load and full speed all the way, the test engine showed wear so slight it was "hardly measurable".

Good reasons why!—Every ring was free —all oil rings unclogged. That alone prevented loss of power, high oil consumption, blow-by, piston and cylinder wear.

All bearings were free from corrosion — and bearing wear was stopped cold.

Carbon formation was exceptionally low — and no hard carbon. Not a sign of scratching or scoring on pistons, rings, liners, etc.

Filter clogging? — Absolutely none — in hundreds of full-load hours!

General Machinery Corporation finds this test "extraordinarily satisfactory". Prove New RPM DELO's cost-cutting, money-making performance for yourself — in any make or type of Diesel. You're passing up extra operating profits every day you don't!

New "RPM" Diesel Engine Lubricating Oil is available everywhere in the gray barrel with the blue head

RPM
DIESEL ENGINE
LUBRICATING OIL

STANDARD OIL COMPANY OF CALIFORNIA

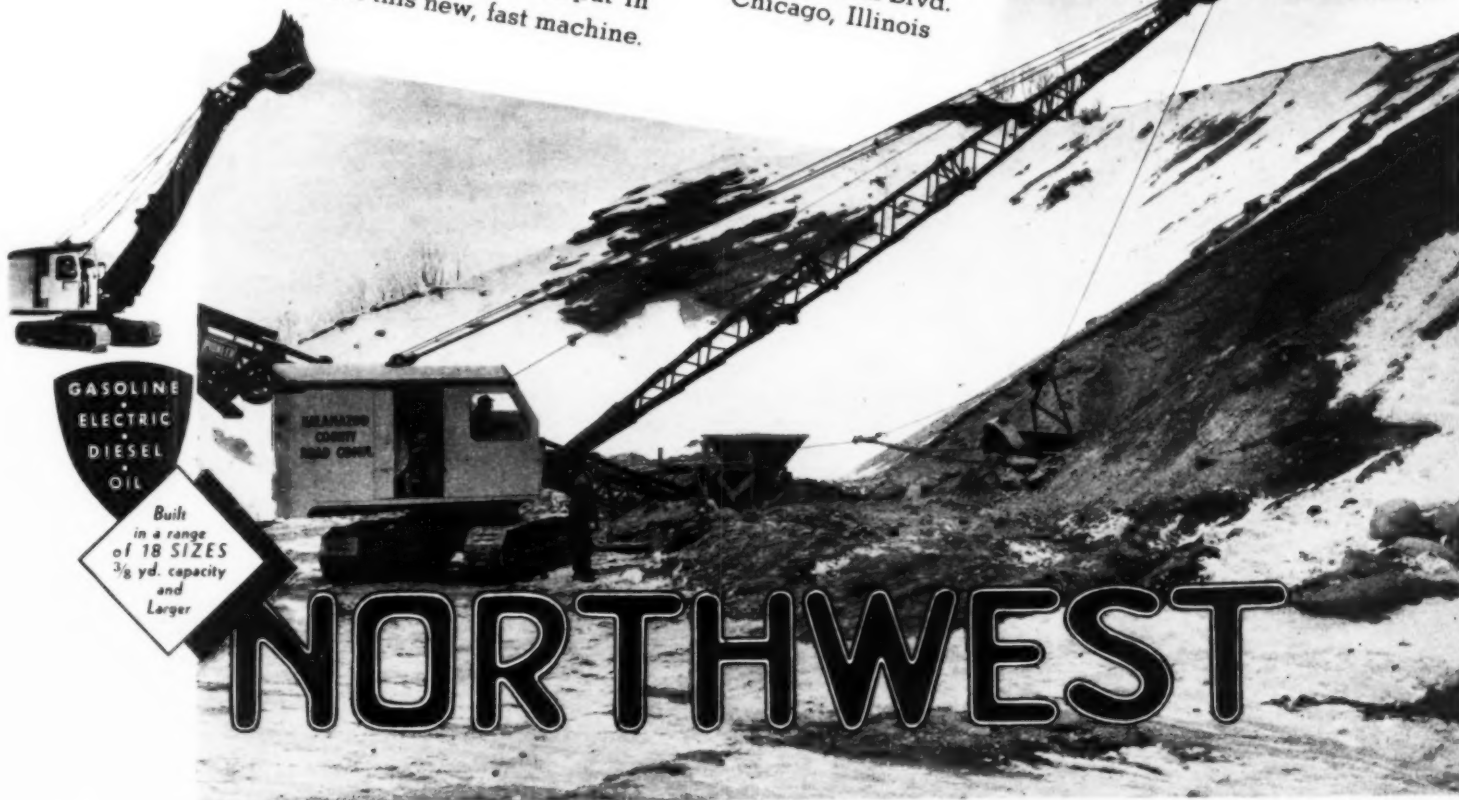
Another NEW Northwest Model



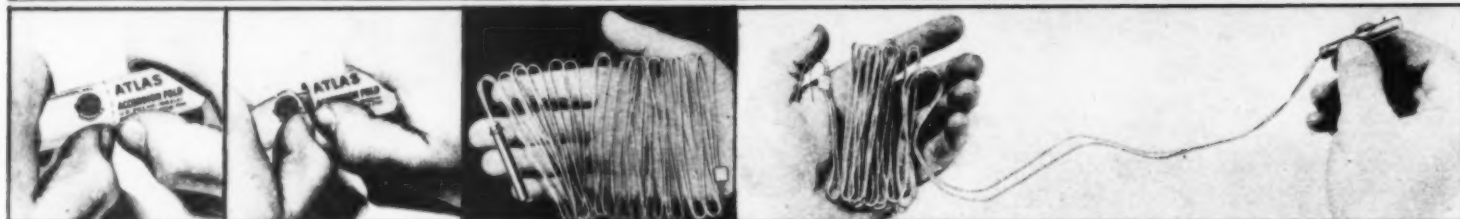
HERE they go — Model 41's — one after another all over the country!

Don't buy a 1 yd. machine without finding out about the new Northwest Model 41 one yd. Shovel. It's convertible to crane, dragline or pullshovel — it's fast, powerful — a *real* rock shovel! It brings you the Dual Crowd, Northwest Welded Boom and Dipper Stick, the Cushion Clutch, the "feather-touch" Clutch Control, Uniform Pressure Swing Clutches and the Northwest Simplicity that means easy maintenance. Remember, when you have a real rock shovel you never have to worry about output in dirt. Ask about this new, fast machine.

**NORTHWEST
ENGINEERING CO.**
1728 Steger Building
28 E. Jackson Blvd.
Chicago, Illinois



Simple Yet Effective Performance —At Least One Hundred Million Times!



Atlas ACCORDION FOLD Electric Blasting Caps

ATLAS ACCORDION Fold Electric Blasting Caps have been used at least one hundred million times! That's a lot of shots in any language—and it speaks volumes in proving the advantages of the Accordion Fold package.

The cap is packed in the center of forty-eight folds of wire (held securely by the heavy paper tube) to protect the detonator. Yet the complete package is the last word in compactness and convenience, as well as safety!

The Atlas Accordion Fold individual package is handy to carry—easy to open—a slight pressure of the fingers "does the trick." Wires extend easily and naturally into position without kink or snarl. Cap end is easily straightened out for priming without disturbing the rest of the accordion fold.

For the easiest, simplest, safest method of handling electric blasting . . . ask the Atlas Representative about Atlas Manasite Electric Blasting Caps in the Accordion Fold package.



ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.
Boston, Mass.
Butte, Mont.
Chicago, Ill.
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Houghton, Mich.
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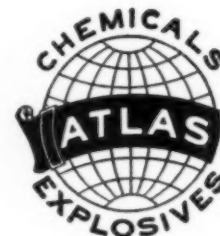
New Orleans, La.
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Philadelphia, Pa.
Picher, Okla.
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Pittsburgh, Pa.
Portland, Oregon
Salt Lake City, Utah
San Francisco, Calif.
Seattle, Wash.

Spokane, Wash.
St. Louis, Mo.
Tamaqua, Pa.
Wilkes-Barre, Pa.

ATLAS

EXPLOSIVES



LEHIGH
EARLY STRENGTH
CEMENT

Against Time and Tide



OWNER:

Pocahontas Fuel Co.
Portland, Maine

ENGINEERS:

Fay, Spofford & Thorndike
Boston, Mass.

CONTRACTORS:

Merritt, Chapman & Scott
New York City

~and high tide only six hours away

THE destructive force of flow tide was successfully combatted by pouring concrete piles for this power plant with Lehigh Early Strength Cement. Concrete was poured at ebb tide—six hours later, at high tide, because of quick curing in the early stages, piles were hard enough to withstand damage.

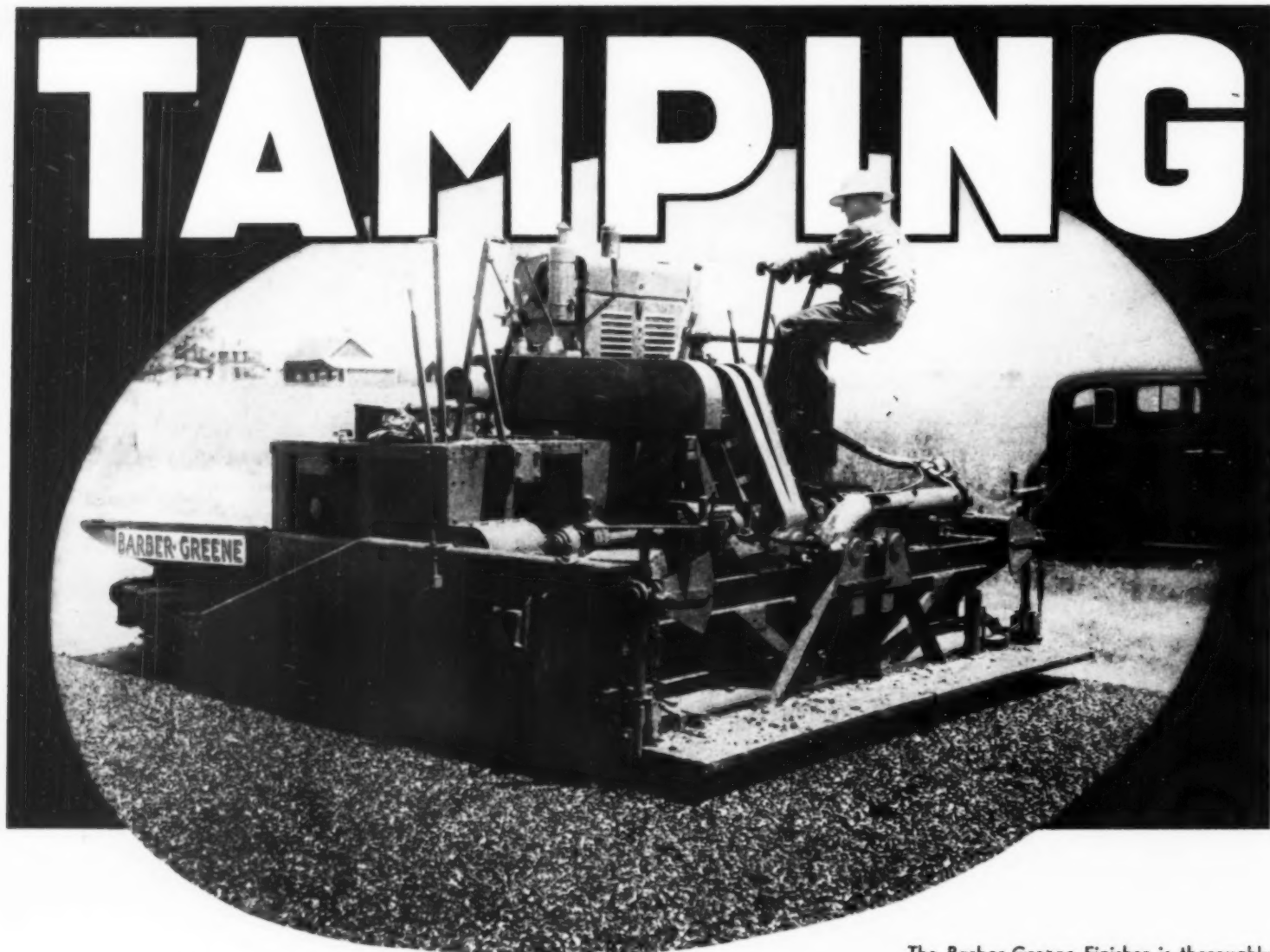
Lehigh Early Strength Cement hydrates 3 to 5 times faster than normal portland cement. The cement paste more effectively coats the aggregates and fills the voids. It makes a workable plastic mass for easy placing. Maximum watertightness is obtained. Used under the same conditions, in 24 to 48 hours the strength of Lehigh Early Strength Cement compares with that of normal cement at 7 days.

Use Lehigh Early Strength Cement when shortened curing time will aid in coordinating schedules; when quick re-use of forms will save money; when quick completion will reduce costs and save on overhead expense. Use it for better, denser concrete for any purpose.

LEHIGH PORTLAND CEMENT COMPANY

Allentown, Pa., Chicago, Ill., Spokane, Wash.

TAMPIING



ONLY the Barber-Greene Finisher *Tamps*. Only *Tamping* gives uniform compaction. Only uniform compaction assures a permanently smooth surface.

The ingenious and greatly superior Leveling Principle of the Barber-Greene would be practically worthless if the Finisher used the common method of merely "striking off" the material. Subsequent rolling and traffic would compact the material more in the thicker portions, and less in the thin, reflecting subgrade irregularities in the top surface.

The Barber-Greene *Tamps* and Levels simultaneously, automatically compacting more material into the depressions. *Even if forms are specified, Barber-Greene Tamping is essential, if the surface is to stay level under rolling and traffic.*

Tamping allows the Barber-Greene to lay stiffer, less workable mixes. *Tamping* kneads and compresses the material into place. *Tamping* not only compacts, but the vibration interlocks the fine particles. *Tamping* greatly reduces rolling, and eliminates local depressions that the roller bridges. *Tamping* simplifies matching joints, as both the old and the new mats are in their compacted states. *Tamping* is not just a theoretical advantage. Hundreds of miles of work throughout the country prove it — all Barber-Greene owners confirm it. We urge you to ask them. Barber-Greene Company, Aurora, Illinois.

The Barber-Greene Finisher is thoroughly described and illustrated in this new 36 page booklet. It comprehensively covers Principles, Accomplishments, and Important Features. You should add the interesting contents of this booklet to your present knowledge. Write for your copy, there is no obligation.



39-4

• STANDARDIZED
MATERIAL HANDLING
MACHINES •

Representatives
in Principal Cities

BARBER GREENE

BRANCH OFFICES
Cleveland • Chicago • New York
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Cable Address: BARGREENE

Standardized Belt Conveyors
CARRIERS
Portable CONVEYORS
and other standardized unit parts

Permanent CONVEYORS

LOADERS for lowest cost loading

Vertical Boom DITCHERS

MIXERS for Bituminous or Stabilized Mixing — Central or Travel Plant

SNOW LOADERS for high speed removal

Leveling-Tamping FINISHERS

Low Cost-High Quality Road Construction

WHAT IT TAKES TO DO THIS

COMES FROM THIS!

Ability To Concentrate Full Power ... When and Where You Want It

• Lorain shovels can spot or spread their power as the digging demands. That's because their Thew Center Drive turntable offers direct power drive to each major power shaft. It is this direct-to-the-point power application, through the fewest number of parts, which enables you to—

- 1 Concentrate full engine power on any one operation to lick the toughest going (as above).
- 2 Distribute power over two or three simultaneous and synchronized operations to obtain smooth, fast, powerful working cycles.

For further evidence of the money-making advantages of Center Drive design, write today for book entitled "The Rocky Road To Success." You'll find facts aplenty to substantiate Lorains' reputation as real rock shovels.

THE THEW SHOVEL CO.
LORAIN, OHIO

LORAINS

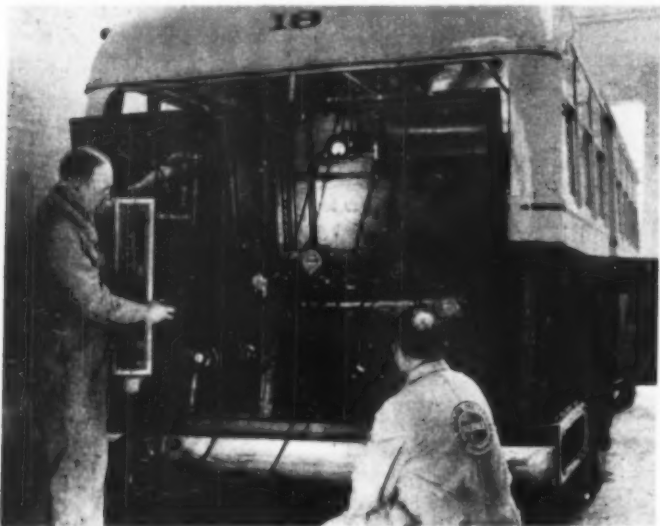


GAS FUMES ELIMINATED FOR CITY COACH CO.

Complaints of gas fumes in the buses of a certain Midwestern city coach company brought a sharp ultimatum from the city health authorities. "Clean up the air in the buses or take them off the street!"

It was no time for this operator to experiment. He called in a Standard Automotive Engineer. From past experience with smoke and odor difficulties, and with his equipment for accurately checking engine performance, the engineer readily located the cause of the trouble.

Today, this coach company has the best record in its state for clean air and smokeless operation.



Smoke and odor troubles are caused primarily by poor engine performance, low manifold temperatures, poor carburetion, etc. This illustration shows some of the equipment a Standard Automotive Engineer uses to locate the real cause of smoke trouble.

STOPS BEARING FAILURES IN COUNTY HIGHWAY EQUIPMENT

Equipment in a county highway fleet was spending almost as much time in the shop as it was on the job. Bearing failures in the gear cases on trucks and tractors were keeping the maintenance gang busy. Then a Standard Automotive Engineer was given a chance to examine the bearings and the used lubricant.

He found the bearings corroded and etched. The lubricant had oxidized and formed a coating on the gear cases. Naturally the bearings were not getting proper lubrication.

The Engineer recommended the right grade of a more stable lubricant for each type of equipment. Bearing failures from this source have been entirely eliminated.



K. E. Mebold, Automotive Engineer, Kansas City, explaining the purpose of various instruments he uses to W. S. Burks, Fleet Manager of the Gillette Transportation Company.

TRUCKER HAULS 15-TON LOADS AND STILL GETS 6 TO 7 MILES PER GAL.

Engines picked up as much as 2 miles per gallon after a Standard Automotive Engineer finished checking a Kansas Transport fleet. On one of the large tractor-trailer units this meant a saving of 3 barrels of gasoline a week under normal operation. And that saving wasn't made by sacrificing power. This unit still handles loads up to 15 tons with ease.

That's where Standard Automotive Engineering Service differs. These Engineers have scientific instruments to locate the real cause of engine inefficiencies. Their instruments are portable. They can be used in your trucks on the road where the engine can be checked for both power and gasoline consumption under actual operating conditions.

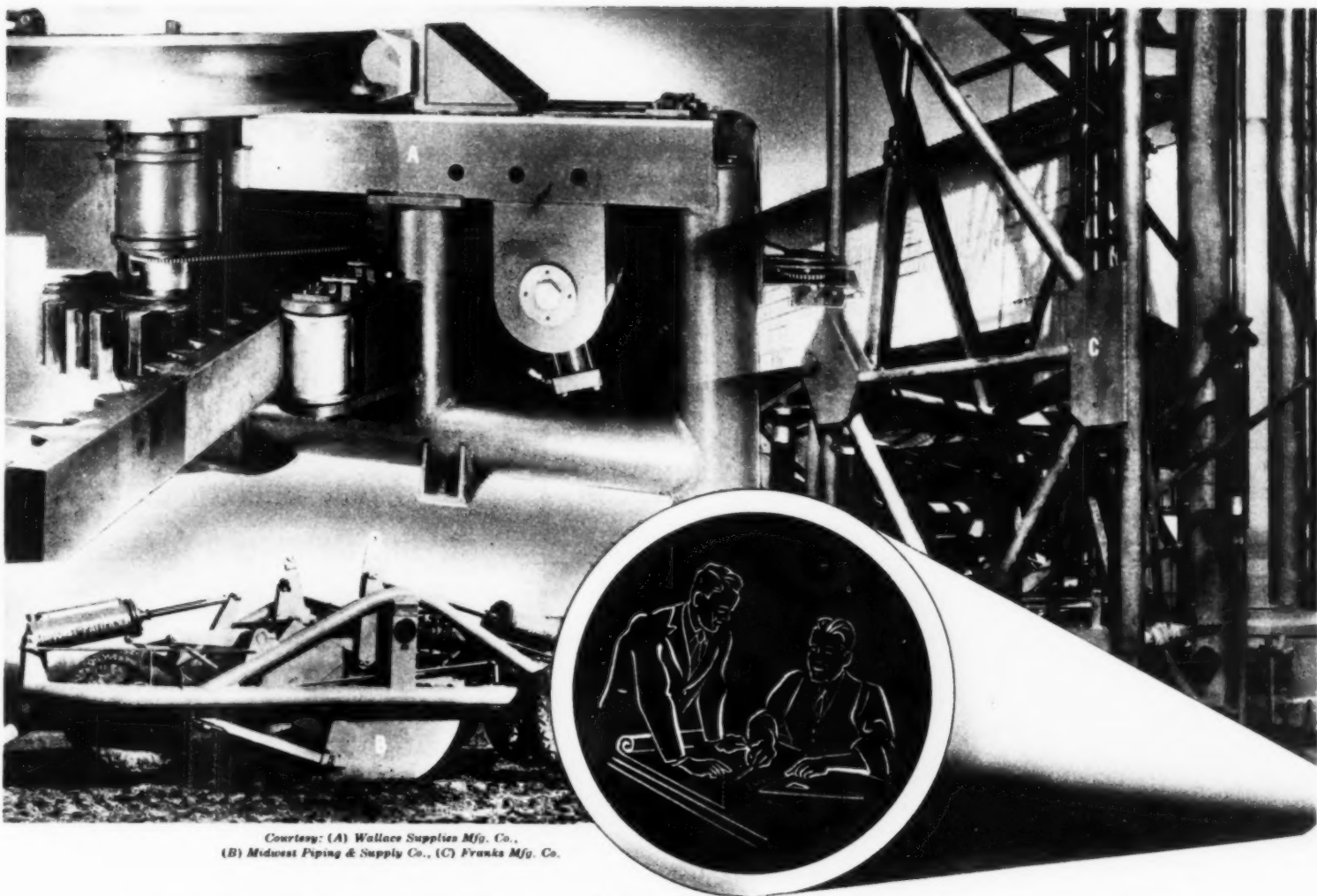
Let one of these Engineers show you just what he does on one of your own trucks. You can reach him through your local Standard Oil (Indiana) office or by writing 910 South Michigan Avenue, Chicago, Illinois. It will cost you nothing but the phone call or post card.

Riding the trucks even on night runs is all a part of the Standard Automotive Engineer's job. Illustrated here are a few of the instruments that tell him what's going on inside the engine under actual operating conditions.



Copyright 1939, Standard Oil Co. (Ind.)

STANDARD OIL COMPANY (INDIANA)
AUTOMOTIVE ENGINEERING SERVICE **LOWERS MILEAGE COSTS**



Courtesy: (A) Wallace Supplies Mfg. Co.,
(B) Midwest Piping & Supply Co., (C) Franks Mfg. Co.

THEY'RE PIPING AWAY THE TWIST & SAG

● By building frameworks out of pipe welded together, machine designers are taking the "give" out of their products and putting feathers in their caps.

Engineers have long recognized that tubular members are exceptionally rigid—ideal for machine frames. Now, welding makes this construction possible. Example:

Effective use of rigid tubular members for the frame of the Wallace Supplies pipe-bending machine shown in (A) yielded the following benefits as compared to the former

welded frame using structural shapes:

23% reduction in set-up time
20% reduction in welding time
10% reduction in weight

Deflection reduced from .103 to .013 inch

Torque capacity increased from 7,000,000 to 13,000,000 inch pounds

By minimizing twist and sag, tubular construction is also improving earth-moving scrapers (B), portable derricks (C), furniture,

aircraft, and hundreds of other new products and structures. And, there are any number of other shapes* which can be fabricated by welding into rigid, light-weight designs for improved performance, greater sales volume and lower costs.

Look into "Shield-Arc" welding today. Call the nearest Lincoln office for counsel or write THE LINCOLN ELECTRIC COMPANY, Dept. G14, Cleveland, O. Largest Manufacturers of Arc Welding Equipment in the World.

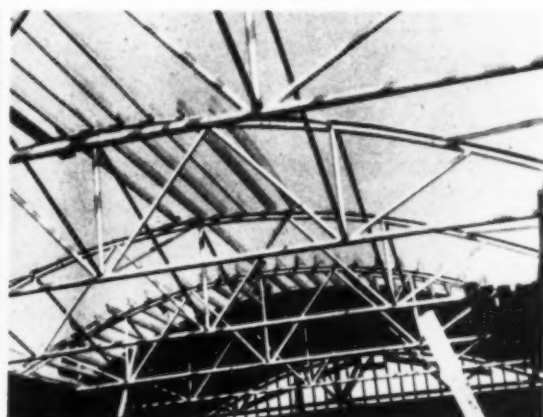
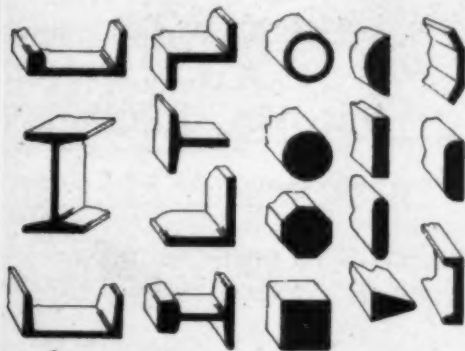
LINCOLN "SHIELD-ARC" WELDING

Unites design ingenuity with superior structural materials for progress

WELDING LIBERTY. The New 200-amp. "Shield-Arc Jr." equipped with self-indicating Job Selector and Current Control, can be "set" for any TYPE of arc or any AMPERAGE to suit every job. This freedom means a wider use of arc welding for lower costs. Price only \$243 f.o.b. Cleveland, freight prepaid.

***DESIGN LIBERTY.** You can use any of these standard steel shapes . . . fabricate special shapes . . . use pressed steel parts or steel castings . . . use any analysis of steel . . . to design for functional requirements with welding. This freedom means progress.

TUBULAR TRUSSES. Pipe often is used to advantage for framework of buildings, grandstands and bridges. These trusses of a building in Monroe, La., were fabricated from 3-in. pipe by "Shield-Arc" welding.



14 CONTRACTORS can't be wrong ...

Every one of 'em
on the Delaware Aqueduct
uses VENTUBE*!

"VENTUBE" helps all fourteen contractors
on the world's biggest tunnel job speed up
work and cut costs!

This rubberized ventilating duct is light-
weight and easy to handle . . . one man can in-
stall the entire system within a few hours. And
"Ventube" is flexible! It goes around corners,
up and down steep inclines . . . yet always
keeps a smooth interior for the unimpeded
flow of fresh air.

"Ventube" gets right up to the heading,
where you need pure, clean air most of all!
Before blasting "Ventube" slides back quickly
and easily to prevent damage. Immediately
afterwards it slides forward again, bringing
you clean, fresh air from the outside. All that
is needed besides "Ventube" to insure best
ventilating results is a motor-driven fan of
proper capacity.

Constant research in Du Pont laboratories
makes "Ventube" amazingly durable! It is
woven of extra-strong, carefully selected fab-
ric. The fabric and even the thread that goes
into the manufacture of "Ventube" are first
processed with a special treatment to resist
fungus growth. Next, this pre-treated fabric is
impregnated and then coated with rubber on
both sides to resist acid water, gases and
moisture!

We'll be glad to estimate on jobs you're fig-
uring and show you how "Ventube" can help
you speed up work and cut costs. Write today!



DU PONT ON THE AIR—Listen to the "Cavalcade of America" every Tuesday, 9 P. M. E. S. T., over the National Broadcasting Company Networks.

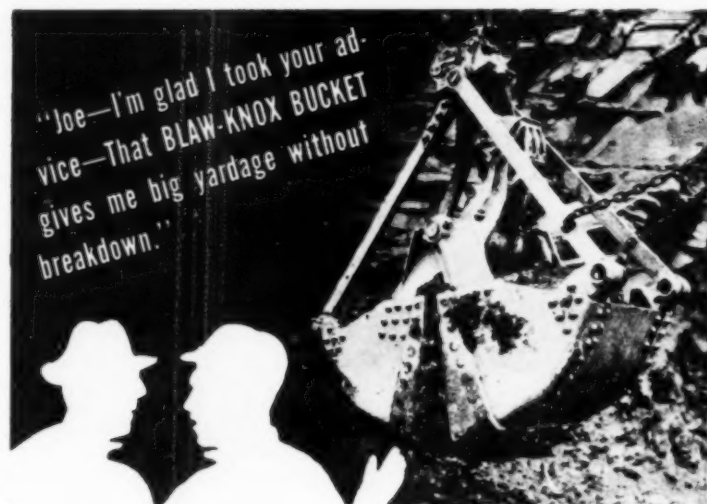


E. I. DU PONT DE NEMOURS & COMPANY (INC.)
"FABRIKOID" DIVISION • FAIRFIELD, CONN.

"VENTUBE" is Du Pont's registered trade mark design-
ating its rubber impregnated flexible ventilating duct.
THE FLEXIBLE VENTILATING DUCT

● This roomy, compact pow-
der bag is made of the same
sturdy material as is "Ven-
tube." The seams are sewed
as tough as rawhide—and the
fabric is coated and impreg-
nated with thick, resistant
rubber. Du Pont powder bags
are available in several sizes.
Write for sizes and prices.





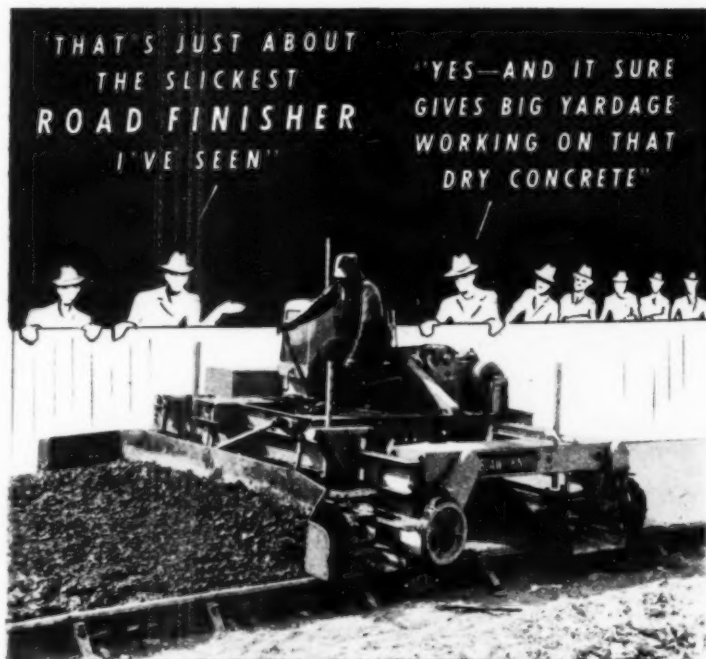
- Contractors know that the proper use of modern steels and alloys at critical points is their assurance of long uninterrupted service when they buy a Blaw-Knox Bucket.

If you aim to increase yardage and efficiency, to reduce maintenance costs and prolong the life of your buckets—investigate Blaw-Knox Buckets for all kinds of digging and rehandling. Send for Blaw-Knox Bulletin No. 1561.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PENNA.
Offices and Representatives in Principal Cities

BLAW-KNOX

Clamshell BUCKETS



If you're on the fence about buying a road finishing machine this season it will definitely pay you to get full information about this new Blaw-Knox ROAD FINISHER.

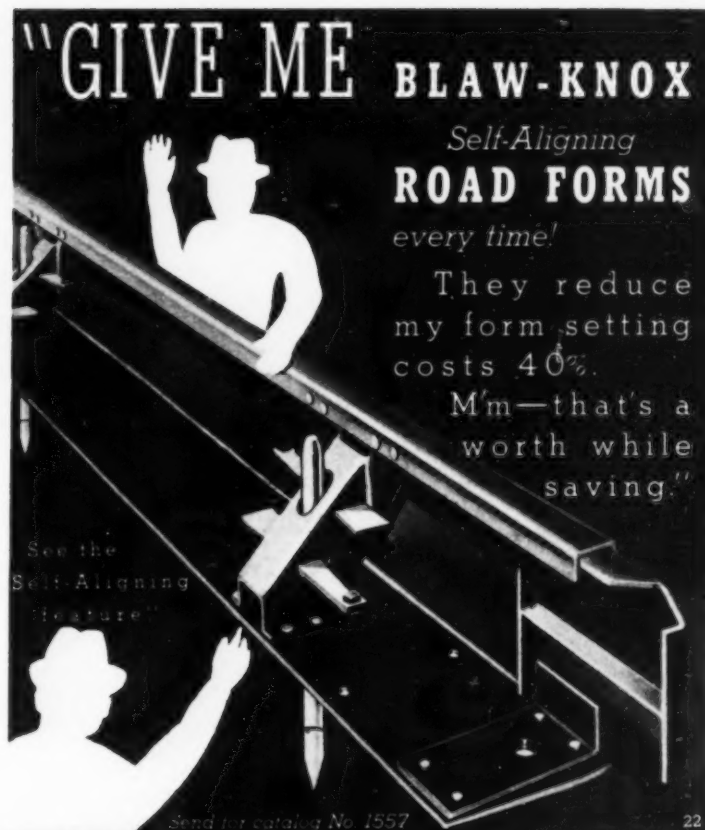
You can depend upon this machine to maintain maximum job production schedules—even when working in dry concrete.

Ask about the ten exclusive features of the Blaw-Knox Road Finisher which make for better and faster paving. See it before buying.

BLAW-KNOX

ROAD FINISHERS

BLAW-KNOX DIVISION
OF BLAW-KNOX CO.
FARMER'S BANK BUILDING - PITTSBURGH, PA.



BLAW-KNOX

Self Aligning ROAD FORMS

BLAW-KNOX DIVISION
OF BLAW-KNOX CO.
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BLAW-KNOX

Agitators and TRUKMIXERS

BLAW-KNOX DIVISION
OF BLAW-KNOX CO.
FARMER'S BANK Bldg. - Pittsburgh, Pa.

Save days and dollars

ON ALL KINDS OF JOBS WITH ATLAS HIGH-EARLY CEMENT!

THE three jobs below show how many a concreting job can be done quicker, and frequently at less cost, with Atlas High-Early cement! That's because concrete made with Atlas High-Early gains strength rapidly. It is ready for its load

often within 24 hours of placing. This may cut down labor and overhead cost; cut curing and protection time costs to less than half. Also it often allows earlier stripping and re-use of forms, cutting down the number of sets needed.

So try Atlas High-Early cement on your next job. You'll find it often pays back its slightly higher cost—over and over again! Universal Atlas Cement Co. (United States Steel Corporation Subsidiary), Chrysler Building, N. Y. C.

FOUNDATIONS—12 DAYS SAVED!



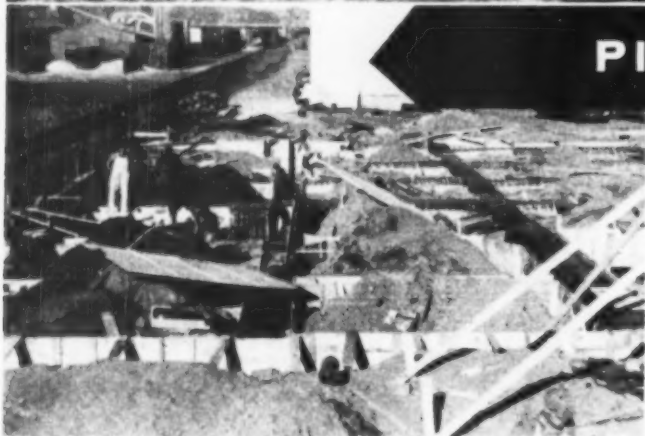
Tank foundations built for Rayonier Inc., a paper mill in Ferandina, Fla., with Atlas High-Early cement. Concrete placed in both tanks in one continuous operation. Placing took, in first foundation, about 5 hours; in second about 8 hours. Use of Atlas High-Early saved 6 days on each foundation. Engineer, Central Engineering Co., Port Angeles, Washington; Contractors, Rust Engineering Co., Pittsburgh, Pa.

BRIDGE—9 DAYS SAVED!



Reinforced concrete county bridge in Schuylkill County, Pennsylvania. Original specifications called for removal of forms in 14 days. But, by using Atlas High-Early cement in parapet, deck, and one span, forms were removed in 5 days. Altogether, 9 days were saved and form costs were cut by using Atlas High-Early. Engineer, Robert Shank, Court House, Pottsville; General Contractor, C. L. Miller, Pottsville; Sub-Contractor, John Starr, Herndon, Pa.

PILES—10 DAYS SAVED!



Piles for foundation of East Street Sludge Disposal Plant, New Haven, Conn. Filling driven pile shells with standard portland cement concrete would have meant holding up nearby drilling until concrete could stand vibration. But—by using Atlas High-Early concrete—piles could be driven close by *the next day!* This saved 10 days on a 20-day job, and \$200 on curing costs. Consulting Engineer, George B. Gascoigne, N. Y.; Acting Director, W. Vincent Barry, Dept. of Public Works, New Haven; Contractor, New Haven Road Construction Co., Inc.

CM-H-11

ATLAS HIGH-EARLY CEMENT

A UNIVERSAL ATLAS PRODUCT



Construction Methods

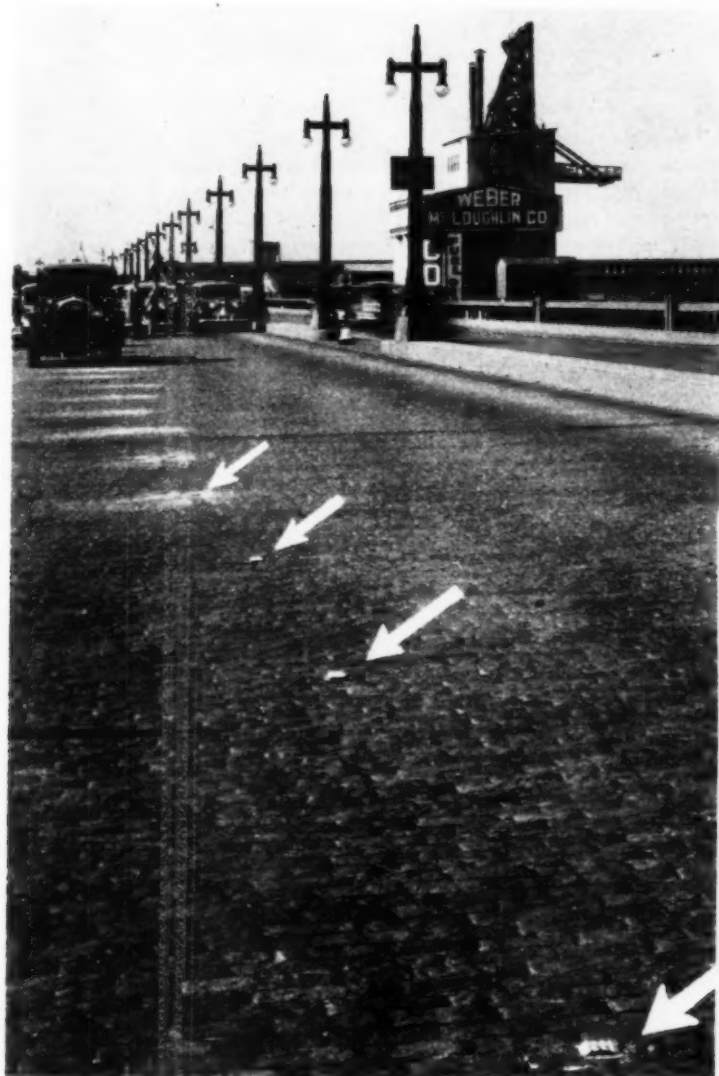
ROBERT K. TOMLIN, Editor

Volume 22

APRIL, 1940

Number 4

Traffic Markers ANCHORED TO GRANITE BLOCK

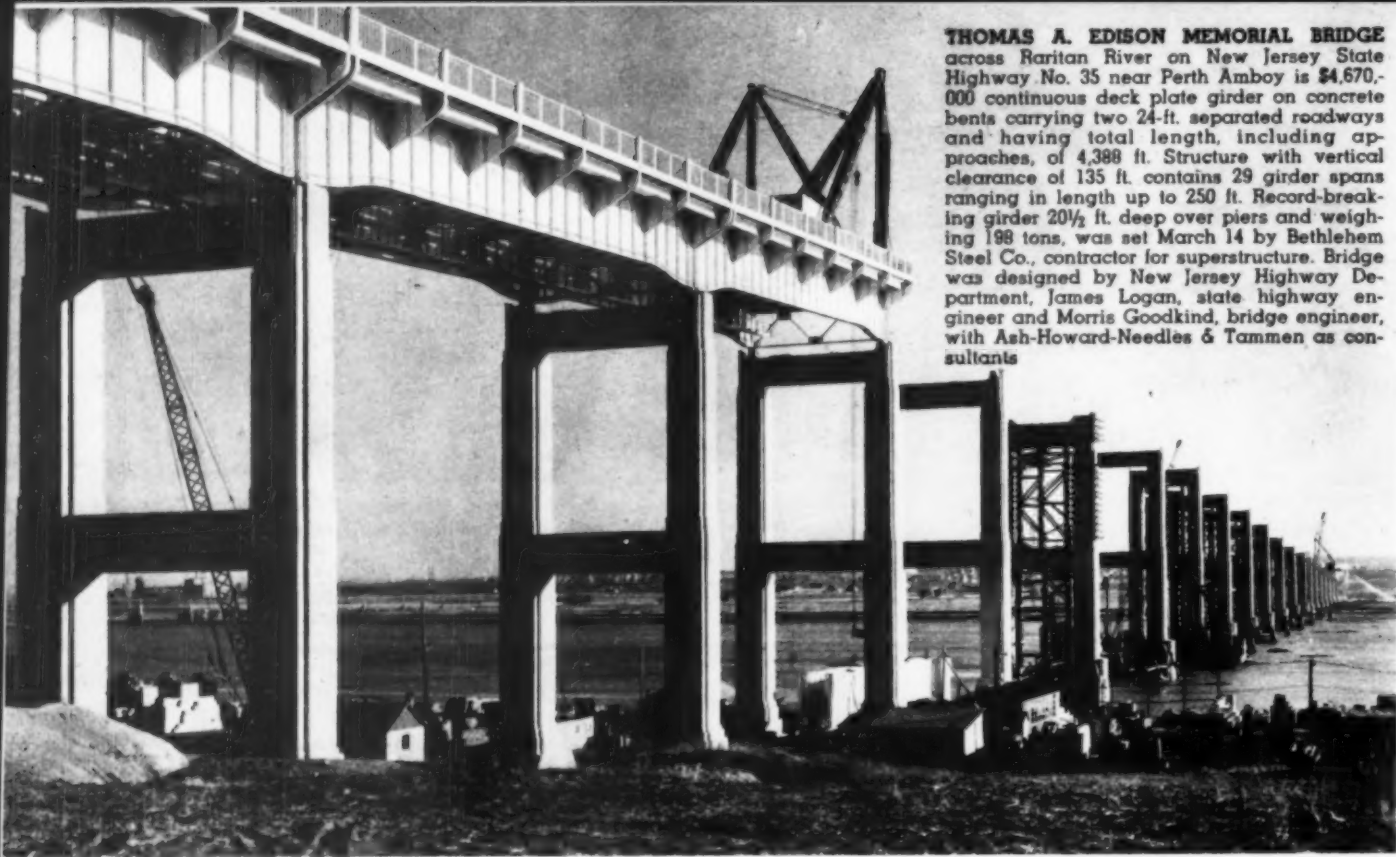


TRAFFIC MARKERS in form of reflecting aluminum alloy plates are anchored to granite block pavement at 15-ft. intervals.

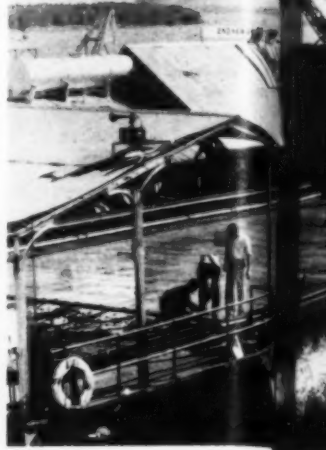


IN DRILLED HOLE anchor tube, threaded on inside, is inserted and marker plate is attached by machine screw of Monel metal.

TO REDUCE COSTS of maintaining painted lines to mark traffic lanes on the West Side elevated express highway, New York City has installed for test purposes lines of reflecting plates of aluminum alloy anchored at 15-ft. intervals to the granite block pavement. Each marker consists of three parts, a Rawl expansion anchor fitted into a hole drilled in the granite block, a reflecting plate with beveled edges and a $\frac{3}{8} \times 1$ -in. machine screw of Monel metal, a corrosion-resisting nickel alloy. The markers are said to cost 50c each, installed, while a 15-ft. length of painted line has to be renewed about every three months at an average cost of 30c per year. The minimum life of the metal markers is estimated at five years. Worn reflector plates can be removed and replaced by unscrewing the Monel metal screw in the anchor.



THOMAS A. EDISON MEMORIAL BRIDGE across Raritan River on New Jersey State Highway No. 35 near Perth Amboy is \$4,670,000 continuous deck plate girder on concrete bents carrying two 24-ft. separated roadways and having total length, including approaches, of 4,388 ft. Structure with vertical clearance of 135 ft. contains 29 girder spans ranging in length up to 250 ft. Record-breaking girder 20½ ft. deep over piers and weighing 198 tons, was set March 14 by Bethlehem Steel Co., contractor for superstructure. Bridge was designed by New Jersey Highway Department, James Logan, state highway engineer and Morris Goodkind, bridge engineer, with Ash-Howard-Needles & Tammen as consultants



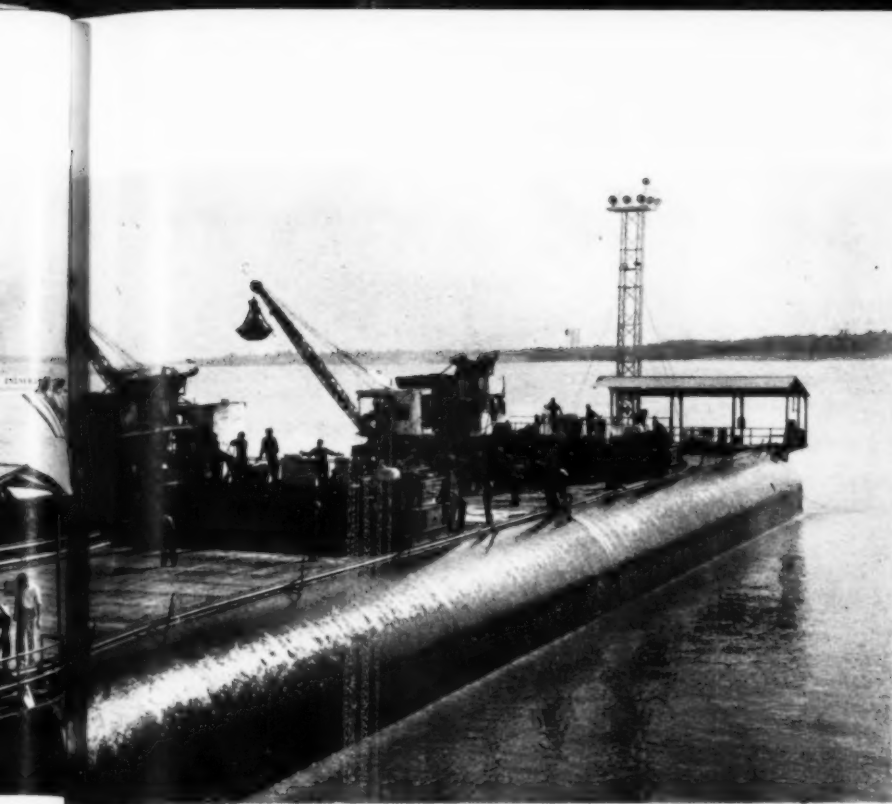
THIS MONTH'S NEWS REEL



10-MILE BELT CONVEYOR, world's longest, will deliver sand and gravel from deposit at Redding, Calif., to site of U. S. Bureau of Reclamation's Shasta dam, under construction by Pacific Constructors, Inc. Conveyor, in 26 flights, requires 16,000 steel tube rollers and 20 mi. of 36-in., six-ply rubber and cotton belting. System will deliver 1,100 tons of material per hour at speed of 550 ft. per minute.

AT HIWASSEE DAM (below), Tennessee Valley Authority structure 1,265 ft. long and 307 ft. high in southwestern North Carolina, rotor of first 57,600-kw. electric power generating unit is installed with aid of huge gantry crane. Closure of dam was completed and storage of water begun Feb. 8.

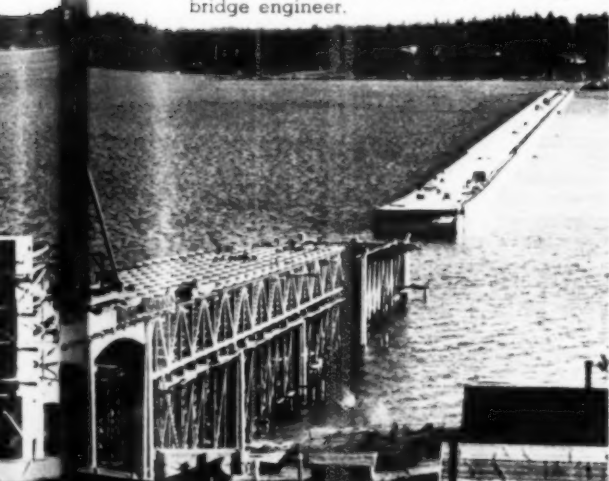




ASPHALT MATTRESS, formed with special paving equipment on barge, is sunk to protect banks of Mississippi River above Westwego, La. from scour. With Government plant and hired labor, Army engineers of Second New Orleans District place huge flexible sheet by moving barge out from shore as sinking progresses.



TACOMA NARROWS BRIDGE across arm of Puget Sound, Washington, enters new construction stage as cable-spinning by Bethlehem Steel Co. starts between lofty steel towers of 5,560-ft. long structure, with main cable suspension span of 2,600 ft. Contract for bridge was awarded to combination of General-Pacific Bridge-Columbia Construction companies for \$5,949,730. For Washington Toll Bridge Authority, Lacey V. Murrow is chief engineer, C. E. Andrew, consulting engineer and Clark H. Eldridge, bridge engineer.



CONCRETE PONTOON BRIDGE (left) to cost \$8,500,000 reaches 6,561 ft. across Lake Washington at Seattle, Wash. Floating roadway, anchored in place by wire rope cables, will be carried by 26 pontoons of cellular concrete design. Largest pontoons are 350 ft. long and 60 ft. wide. Contractor for project under direction of Washington Toll Bridge Authority, is Pontoon Builders, Inc., comprising J. H. Pomeroy & Co., Parker-Schramm, Inc., Puget Sound Bridge & Dredging Co., and Clyde W. Wood.

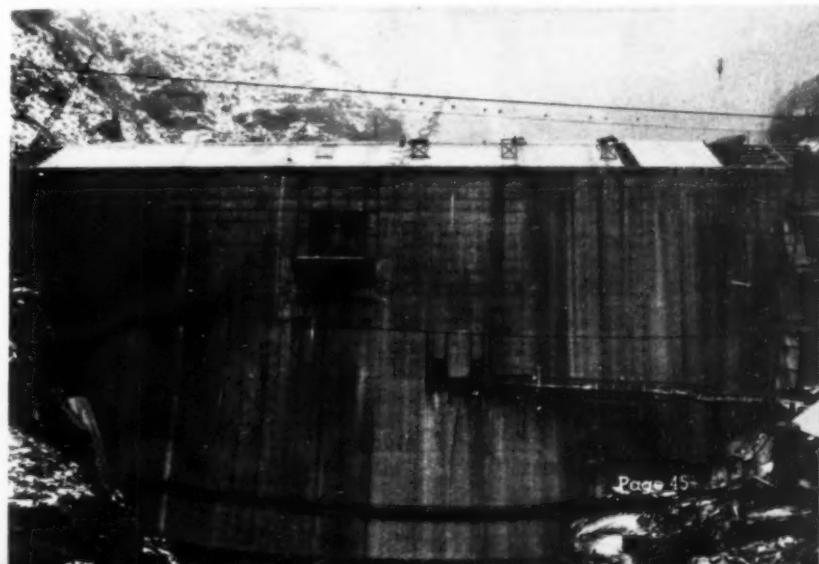


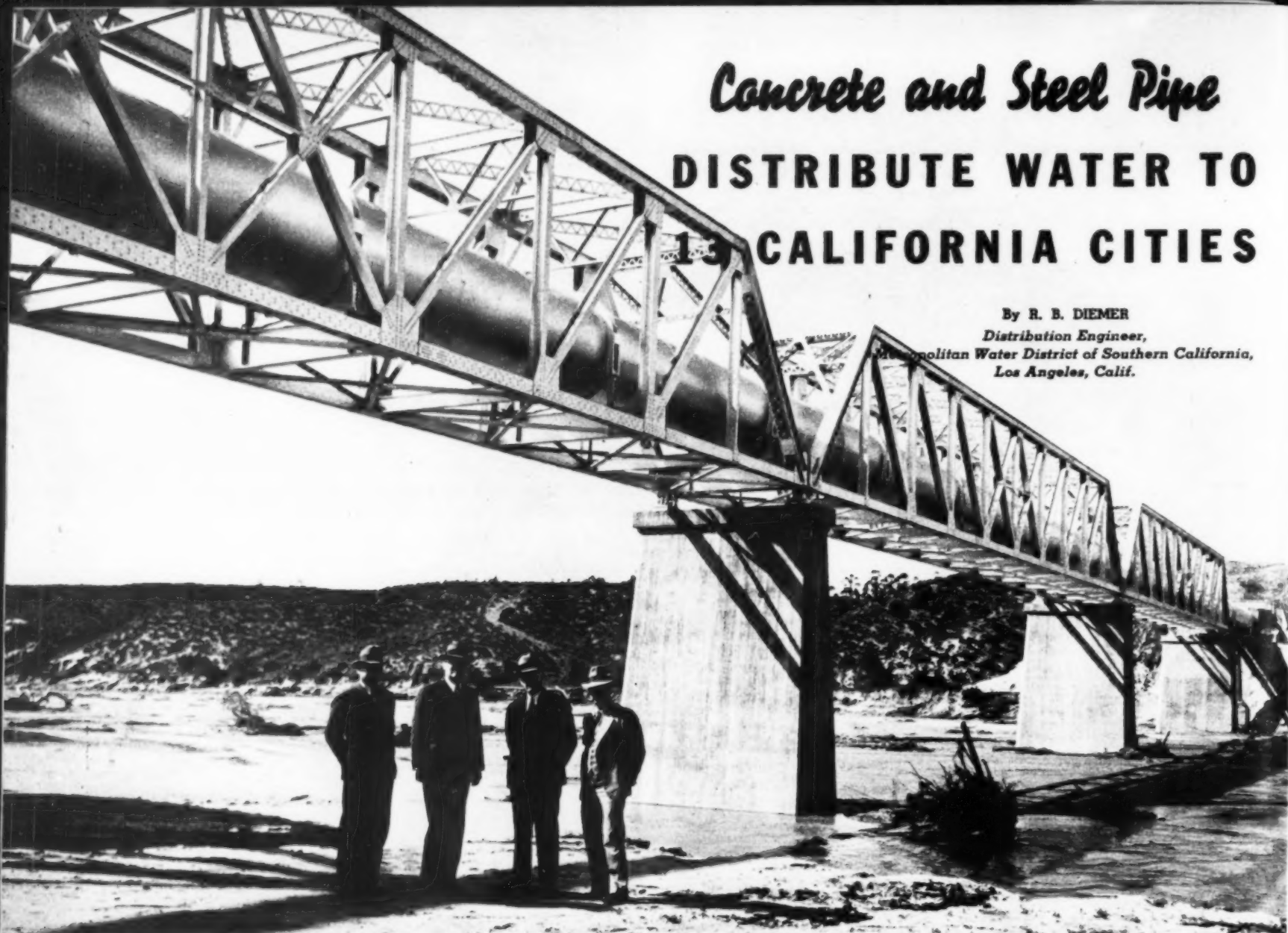
PAVING OF ROADWAY of Queens-Midtown tunnel under East River, New York City, progresses as crew of Walsh Construction Co. empties concrete from bottom-dump bucket within 31-ft-diameter bore for vehicular traffic between Manhattan and Long Island City.



CRAFTSMANSHIP AWARDS for work of conspicuous excellence on U. S. Rubber Co. building, fourteenth and final structure comprising Rockefeller Center, New York City, are made by Nelson A. Rockefeller, under sponsorship of New York Building Congress. John W. Harris, builder, praised skill and speed of members of general and subcontracting organizations.

CONCRETE POURING AT ROSS DAM (below) across Skagit River near Seattle, Wash., was completed under \$4,000,000 contract by General-Shea-Columbia Construction Co. Jan. 30. Structure of arch type built for Seattle's Department of Lighting has present height of 305 ft., which will be increased to 653 ft. at some future date. Concrete was placed by high-line cableway with traveling head tower, operated by remote control. For Seattle's Department of Lighting E. R. Hoffman is superintendent and W. B. Wollendale, principal engineer.





Concrete and Steel Pipe DISTRIBUTE WATER TO 13 CALIFORNIA CITIES

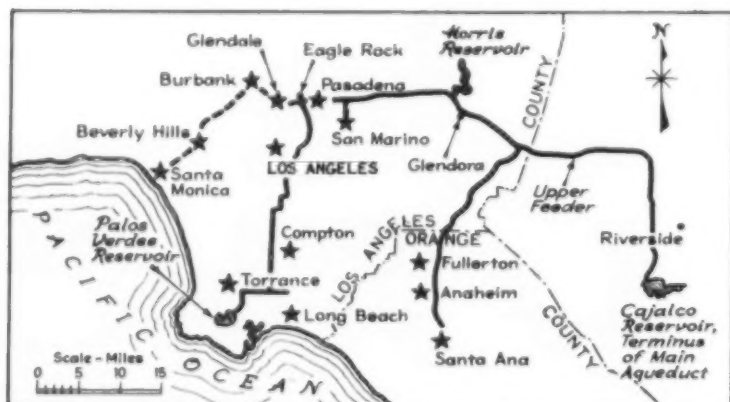
By R. B. DIEMER

Distribution Engineer,

Metropolitan Water District of Southern California,
Los Angeles, Calif.

STEEL PIPE CROSSING SANTA ANA RIVER on bridge, consists of three steel truss spans totaling 543 ft. in length, with eight 50-ft. approach spans. Line has daily carrying capacity of 500,000,000 gal. of water.

NEAR THE EASTERLY EDGE of the coastal plain 10 mi. southwest of Riverside, Calif., the 242-mi. main line of the Colorado River aqueduct ends at Cajalco reservoir. In order to deliver water from the Colorado River to service areas in and around Los Angeles, 75 mi. distant, a 150-mi. initial distributing system has been designed and is being constructed, leading westerly from the reservoir. While the main line will deliver water at a fairly constant rate to Cajalco reservoir, with a present capacity of 100,000 acre-ft., the distribution system will deliver water under pressure to meet varying requirements of 13 cities, all at different elevational zones, and of such potential areas as may join the district in the future.



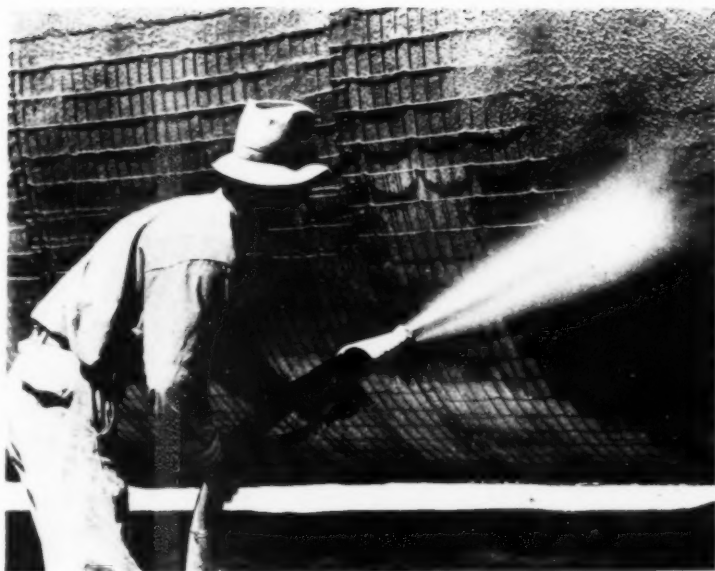
LOCATION OF UPPER FEEDER and cross feeders of 150-mi. distribution system for Colorado River Aqueduct.

Principal features of the initial distribution system, as indicated on the accompanying map, consist of a high line, known as the upper feeder, from Cajalco reservoir 62 mi. to Eagle Rock; a main cross feeder extending southerly from the upper feeder at Eagle Rock together with laterals and an operative reservoir; a line to nearby Orange County terminating in Santa Ana; and a lateral from the upper feeder westerly to Glendale and Burbank. Beverly Hills and Santa Monica will be served by an extension of the Burbank lateral or an exchange of water with the city of Los Angeles.

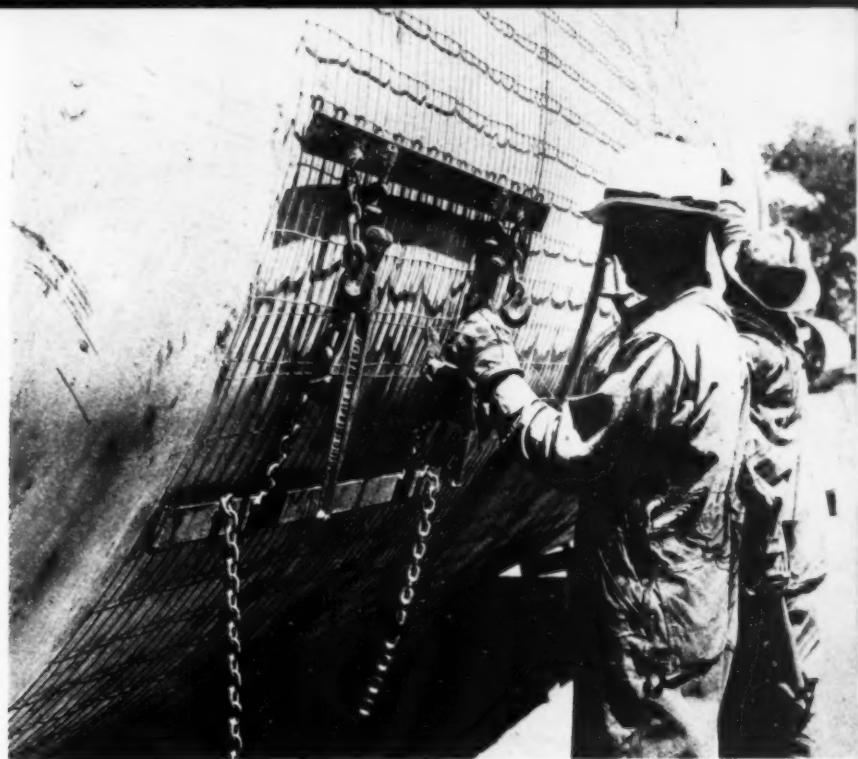
Further, to have a substantial amount of storage on the distribution system closer to points of use than Cajalco, the district has contracted to purchase from Pasadena its Morris reservoir which, with net storage capacity of 38,000 acre-ft., will be connected to the upper feeder.

The upper feeder, now completed, has a capacity of 500,000,000 gal. daily. All the line is designed to operate under pressure, and drops from an elevation of 1,280 ft. at Cajalco to 940 ft. at Eagle Rock. It consists of 10.3 mi. of welded steel pipe; 35.7 mi. of precast concrete pipe; 0.3 mi. of cast-in-place concrete siphons; and 15.7 mi. of circular pressure tunnels. Diameters vary from 9 ft. 8 in., to 12 ft. 8 in. In general, where the lines pass through private property, easements were obtained and the pipe buried a minimum of 4 ft. below the ground surface for protection against erosion and to permit owners to use the ground for agricultural purposes after completion of construction work.

Steel pipe is used on the upper feeder for the high-head siphon which crosses the Santa Ana River, extending a total distance of 10.3 mi. from a point south of Arlington into the Jurupa hills. The line crosses the river on a bridge con-



GUNITE IS APPLIED to exterior of pipe through fire hose equipped with auxiliary compressed air line.



STRETCHING STEEL WIRE around steel pipe, preparatory to applying outside Gunite coating $\frac{3}{4}$ -in. thick is done with aid of pull-jacks.

sisting of eight 50-ft. approach spans and three 181-ft. steel truss bridge spans supported by piers 43 ft. high and with footings varying in depth from 30 to 50 ft. Normally, this line will carry more water above than flows in the river.

So much for a general view of the distribution system. Of what is it constructed . . . and how?

Welded Steel Pipe

Steel pipe of diameters from 9 ft. 8 in. to 11 ft. 6 in. was fabricated at the contractor's plants in Los Angeles in sections 33 ft. 4 in. long from plates 100 in. wide and varying in thickness from $\frac{17}{32}$ to $\frac{31}{32}$ in. All shop joints and seams were butt-welded, using automatic electric machines. Where plate thickness exceeded $\frac{5}{8}$ in., the welded pipe was placed in a closed furnace and annealed to eliminate welding stresses. Upon completion, each section was tested hydraulically to a stress of 22,000 lb. per square inch, which is approximately 150 per cent of the working stress.

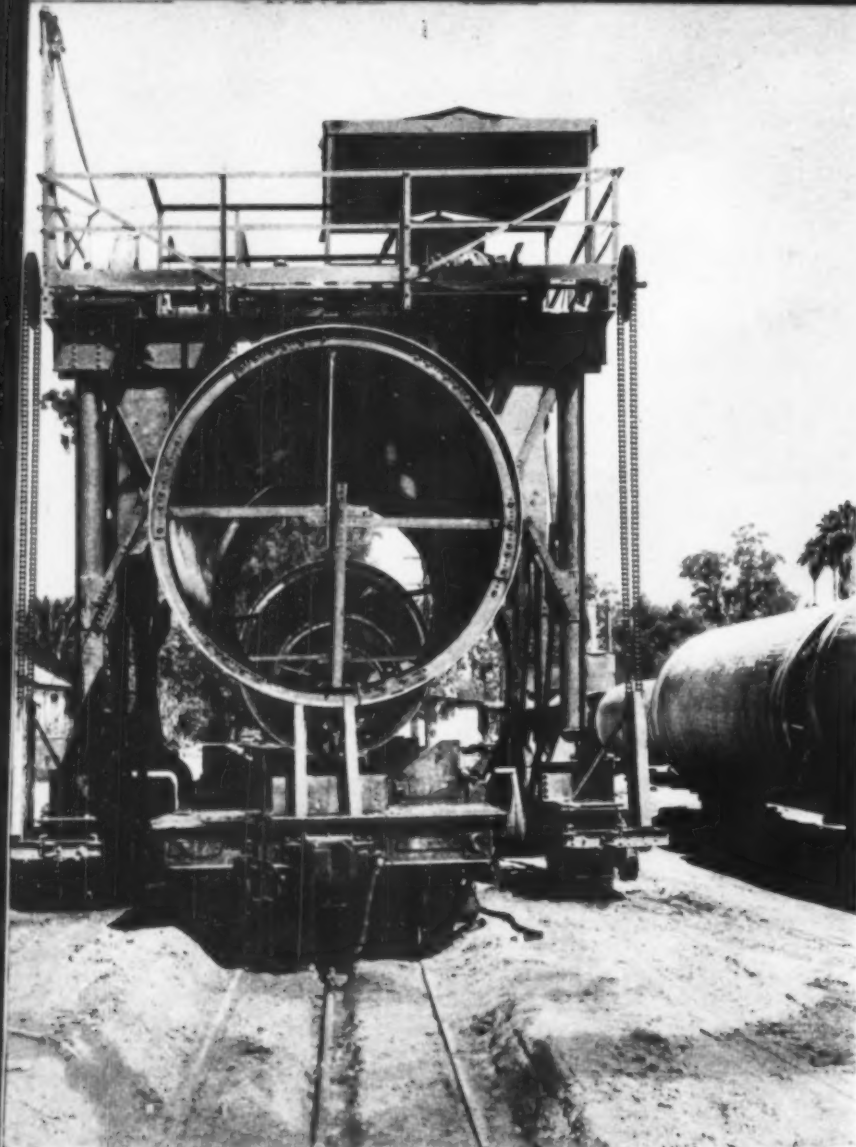
For protection against corrosion, the pipe was given a $\frac{3}{32}$ -in. coating of coal tar enamel on the inside and a $\frac{3}{4}$ -in. outside coating of Gunite, reinforced with steel-wire mesh. Where very corrosive soil conditions existed, an outside

ELECTRICAL WORKERS (below) prepare to test coal-tarred joints for thickness.



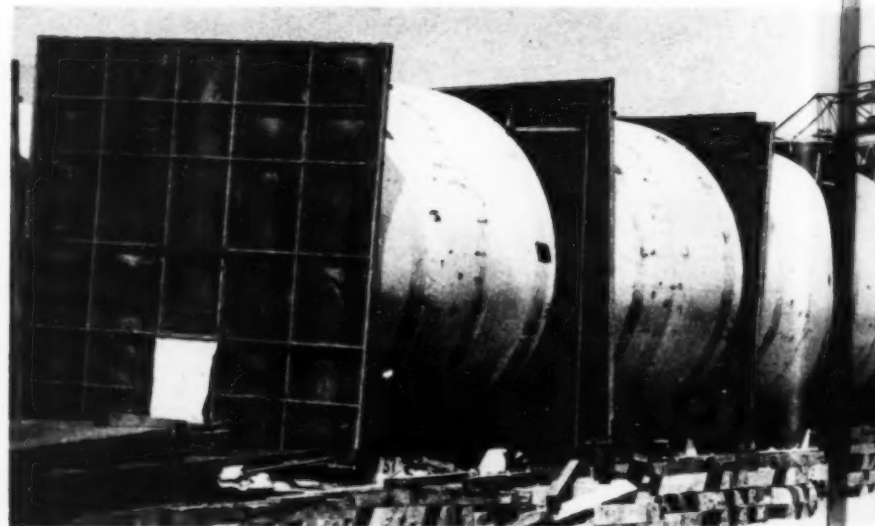
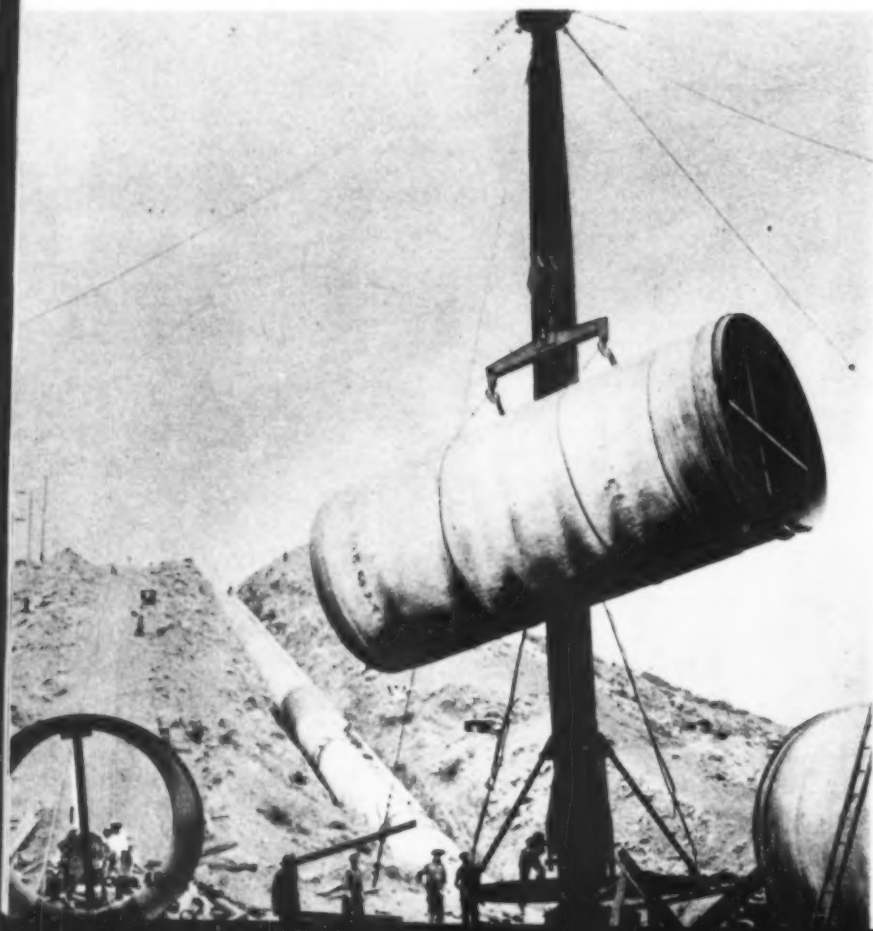
EFFICACY OF COAL TAR COATING of steel pipe at joints is tested by brush moved about surface. Electrical meter records thin and blank spots.





ESPECIALLY DESIGNED GANTRY picks up pipe and, after straddling flat car, lowers pipe on to bed for transport to trench.

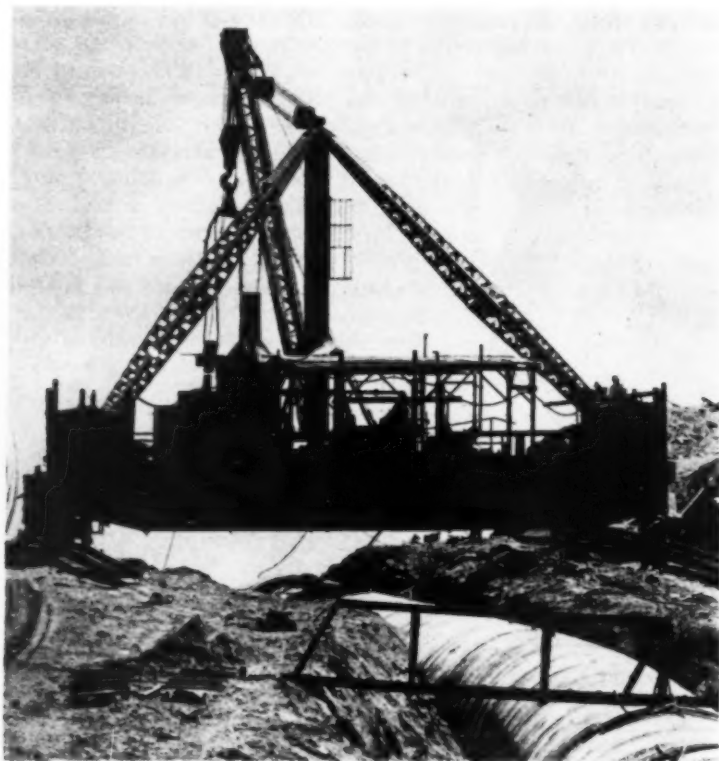
HEAVY SECTIONS OF STEEL PIPE (below) are unloaded by guy derrick and delivered up steep hills on auxiliary rail lines, tractors supplying motive power.



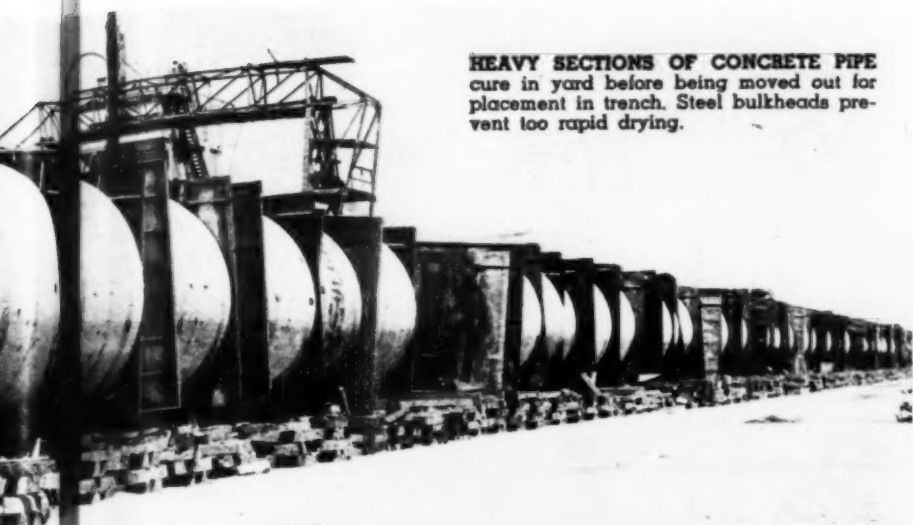
coating of coal tar enamel was also used underneath the Gunitite. For best results in obtaining a bond between the enamel and the steel it was found necessary to preheat the pipe to a temperature of about 190 deg. F. for the enameling operation. All enameled surfaces, both inside and outside, were carefully inspected for imperfections by an electrical detector.

After the enameling had been completed in the Los Angeles plants, the fabricated pipe sections were shipped by rail to a centrally located field plant, near the trench, where the cement-sand coating was shot on and cured for 7 days. In curing, a water spray was used for a period of 4 to 8 hr., after which two coats of coal tar cutback were sprayed on and covered with whitewash for temperature control. An exterior coating of whitewash for temperature control also was used when the enameled pipe was shipped from Los Angeles to the field.

A specially designed tractor-gantry handled the pipe in the field yard. This gantry was mobile and did not require the use of tracks. The completed pipe sections, weighing from 18 to 30 tons, were transported from the field yard to the trench side on trucks constructed especially for this purpose, and were unloaded from the trucks and placed in the



DITCH-STRADDLING MACHINE, especially built for big job, lowers pipe into trench



HEAVY SECTIONS OF CONCRETE PIPE cure in yard before being moved out for placement in trench. Steel bulkheads prevent too rapid drying.

trench by a heavy-duty crawler type crane which traveled along the roadway beside the trench.

All field joints were lap-welded with portable arc-welding machines. Each welded joint was tested by forcing a soap solution under 100-lb. pressure into the space between the inside and outside welds. After this test, the enamel and Gunitite coatings were completed at the joints, and the pipe was backfilled by puddling.

Precast Concrete Pipe

A complete plant for manufacturing and curing the 35.7 mi. of precast concrete pipe of diameters from 9 ft. 8 in. to 12 ft. 8 in. was established by each of the three contractors at a convenient point near the pipe line. Procedures varied somewhat as to detail at the various plants, but were similar in all essential respects. Daily output at the plants varied from 12 to 16 pipe sections, each 12 ft. long, and was governed by the number of forms provided for the work.

Bar reinforcement was wound into cages on an electrically driven drum and welded to the longitudinal steel, and lock joints were used to form a complete unit. Concrete for the

(Continued on page 111)



STIFF-LEG DERRICK on mounting spanning trench places heavy concrete pipe sections, ranging up to 46 tons in weight



IN PIPE-CASTING YARD (below) movable gantry straddling forms carries hopper fed with concrete from bottom-dump buckets raised by crane



WYVERNWOOD HOUSING PROJECT with 143 buildings and 1,102 family units, has 25 children's playgrounds. All streets are at rear of buildings, laid out with curves and grades to slow up traffic. Only 22 per cent of 72-acre site is occupied by houses.

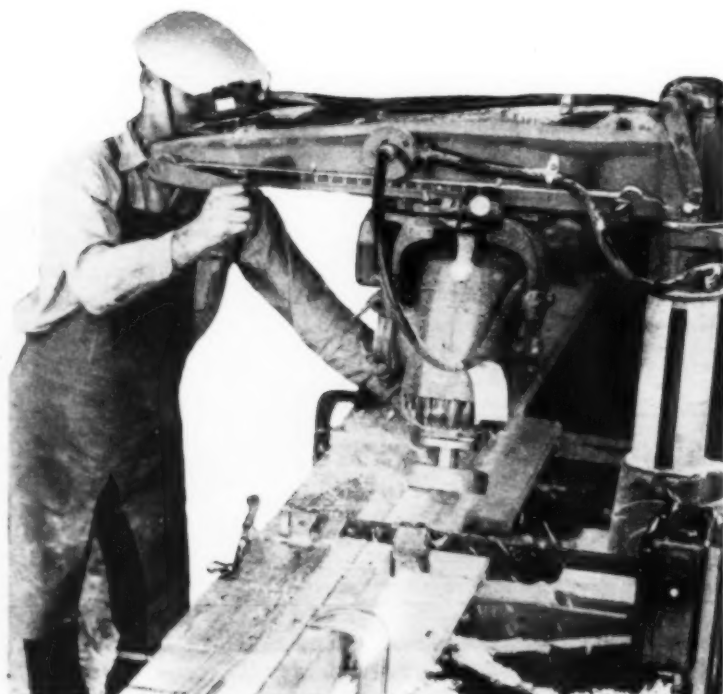


BUILDINGS are two-story framed stucco units.

Building-a-Day Pace **MAINTAINED BY LINE-PRODUCTION METHODS**



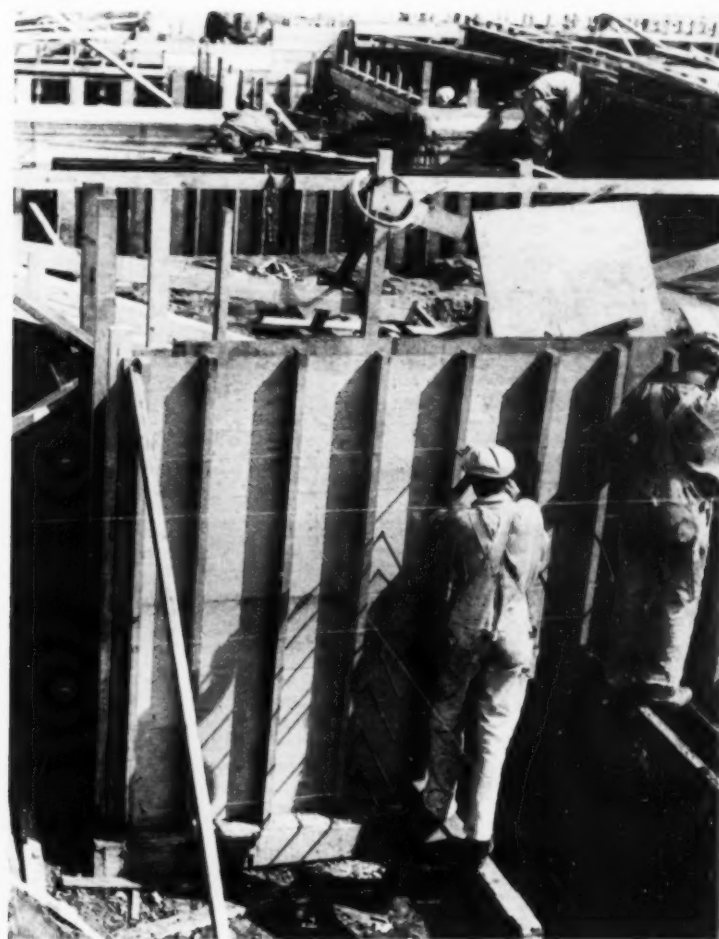
ON FILLED GROUND 18-IN. HOLES were bored 6 to 25 ft. deep, then filled with concrete to form piers (with expanded bases) that prevented settlement. More than 2,700 of these piers were put down totaling 38,000 lin.ft.



AT THE MILL, located at harbor where lumber was unloaded from ships, all framing was pre-cut, marked and bundled so that an entire building could be shipped as unit.



LUMBER FOR EACH HOUSE, accurately precut and separately bundled, was loaded at mill and delivered to meet construction requirements exactly.



CONSTRUCTION CREWS were organized so that same men did same work on each successive structure. This crew, here setting foundation forms, was followed by another crew pouring concrete, still another to strip the forms and so on.

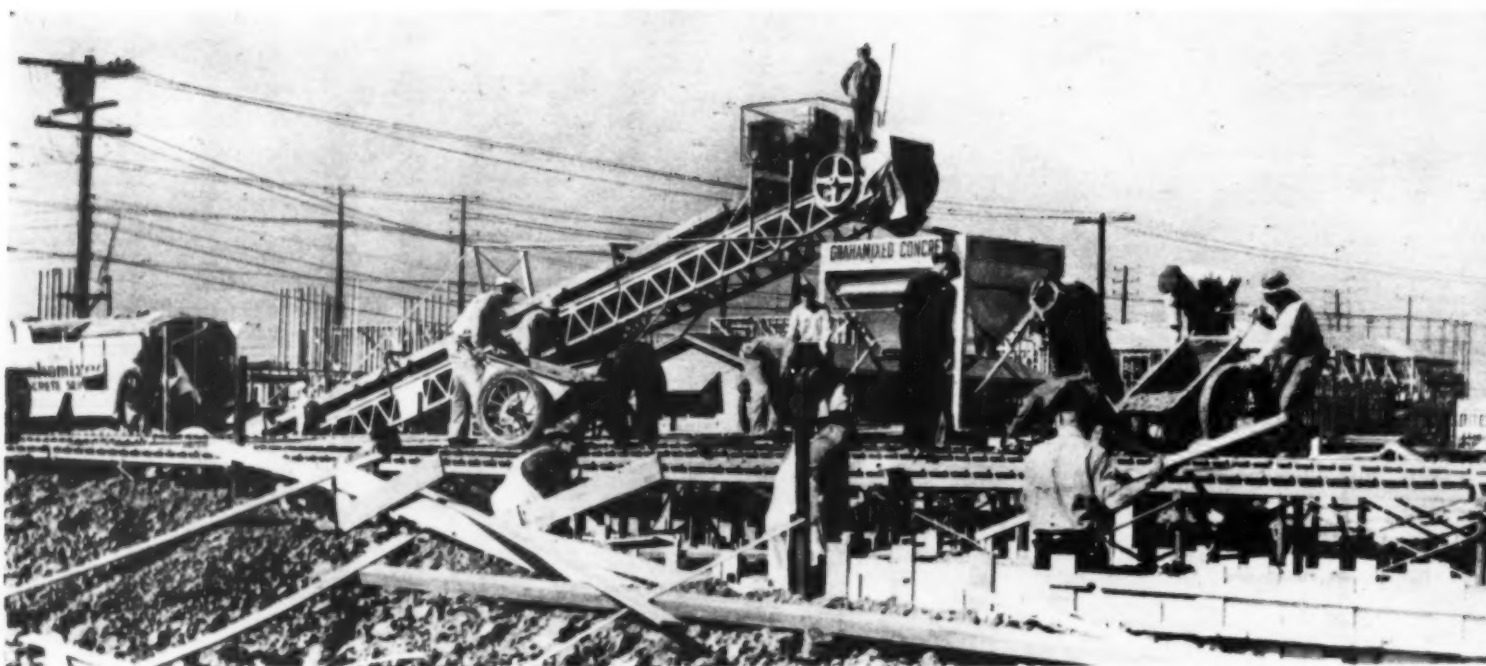
BUILDING CONSTRUCTION organized on a quantity production basis to obtain maximum accuracy, speed and economy, marks the Wyvernwood housing project recently completed for the D. Herbert Hostetter Estate in Los Angeles. On this job within a twelve-month period (January 1939 to January 1940) 1,102 family units of 3 to 6 rooms each, in 143 two-story framed stucco buildings were constructed, starting from the rough grading and finishing with grounds landscaped and the living units partly furnished ready for occupants to move in.

Known as the nation's largest community of rental homes within a park, this \$6,000,000 undertaking 10 min. from downtown Los Angeles, is privately owned and operated without aid from public funds. That portion of the funds obtained as a loan is insured by the FHA.

Work began with the moving of 300,000 cu. yd. of earth to modify the natural contour on the 72-acre tract to get the maximum advantage in privacy for each structure. Carrying scrapers moved the earth and spread it ready for compaction by sheepfoot tampers. Excavation for foundations was made



TRACTORS AND CARRYING SCRAPERS started on grading and earth-moving job Jan. 10, 1939. Advantage was taken of 50-ft. difference in elevation to give buildings maximum privacy.



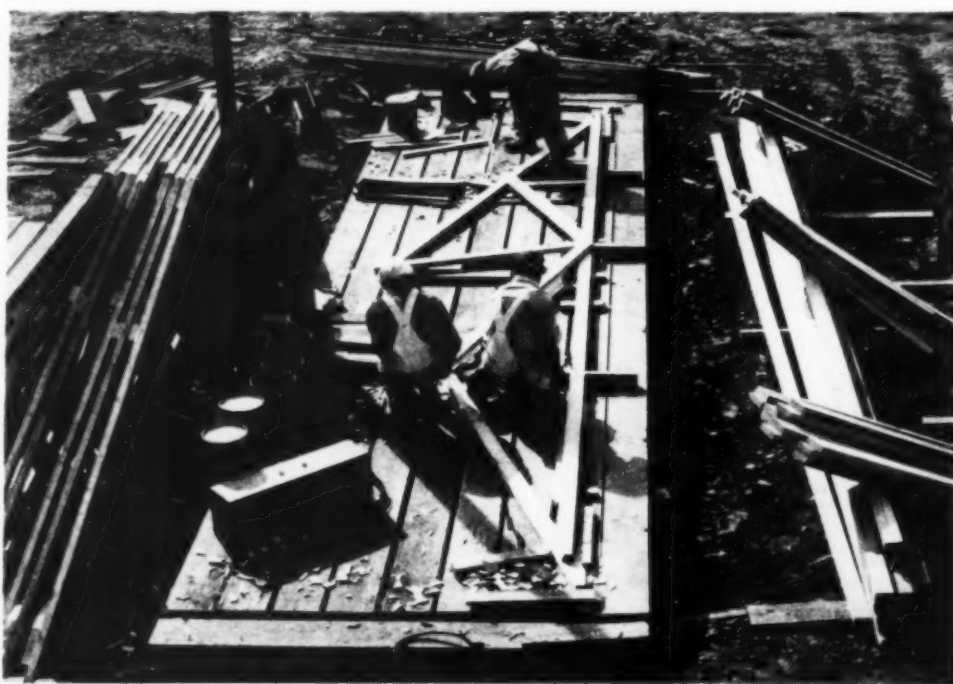
READY-MIXED CONCRETE, trucked to job, was delivered by belt conveyor into receiving hopper that served hand-buggies. Runways on which these buggies operated were built of light standard units easily moved from structure to structure.

with air-driven spades and 18-in. augers were used where the structures were supported on piers put down through filled ground.

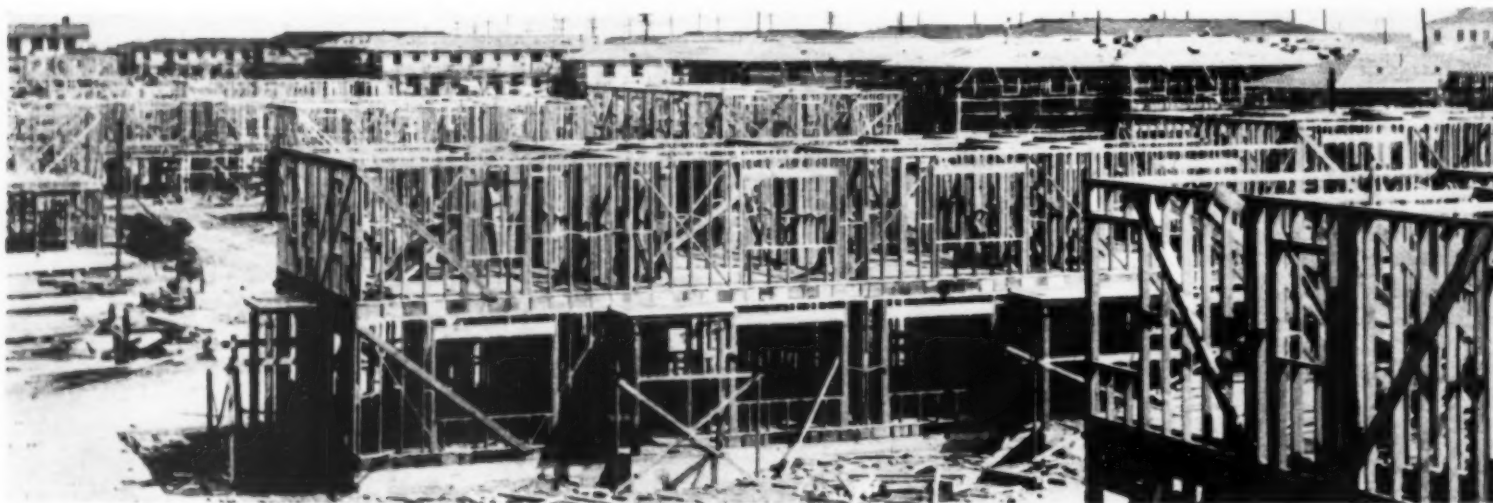
In addition to the buildings themselves, the general contract included underground conduits for all utilities, all storm drains, sewers, streets, curbs, sidewalks, and even children's playgrounds. Thus it was possible to lay out the entire project with a view to making each successive construction operation fit accurately into the program as a whole. In fact, as distinct from the usual job with numerous independent agencies, Wyvernwood was organized more like a military maneuver with all departments coordinated to carry out the strategy of the high command.

Crews in each of the crafts functioned much like the line assembly in an automobile factory; each man did the same

(Continued from page 104)



ASSEMBLY OF ROOF TRUSSES is done on templet. Note location of material piles. Trusses were hoisted into place by crawler cranes that lifted second floor materials, roof sheeting and shingles.



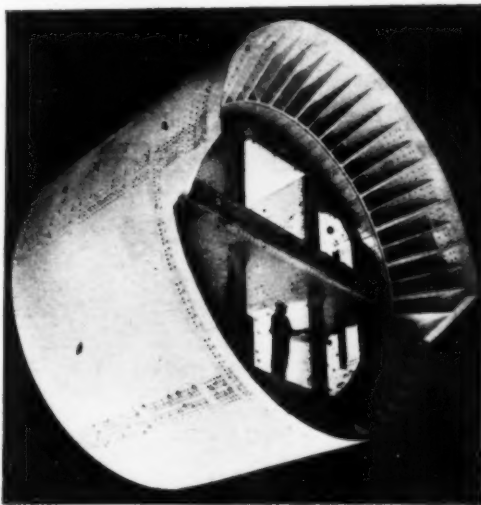
GROUP OF HOUSES in various stages of construction. All buildings are from 125 to 200 ft. apart.

THE FIRST OF THE FOUR SHIELDS that will dig the Loop sections of Chicago's \$40,000,000 subways went into operation Jan. 9 when it was placed under air pressure. The shield method of tunnel construction is desirable in Chicago because of the clay subsoil. Two shields starting from South State St. at 11th St. work north, while the other two, erected in the abandoned streetcar tunnel on La Salle St. at Lake St., work eastward to Dearborn St., then south on Dearborn St.

A 35-ft. open cut half a block long was made on the west side of State St., terminating in a shaft for constructing the shield. For the open cut, MZ-38 weight sheet piling was used along the sides, and heavier sheet piling, M-117, was used in the shaft itself. Penetration of the piling was 5 to 10 ft. Wales around the shaft for the shield ranged up to 36-in., 300-lb. H-beams. The shaft was 8 ft. wider than it was long to accommodate the dimensions of the shield.

The shield itself (the four shields are identical in construction) weighs 190 tons, is 19½ ft. in length, including the cutting edge, and 25 ft. 2¾ in. in diameter. The shell is formed of three plates laminated to a 2½-in. thickness

First Shield STARTS DIGGING CHICAGO SUBWAY



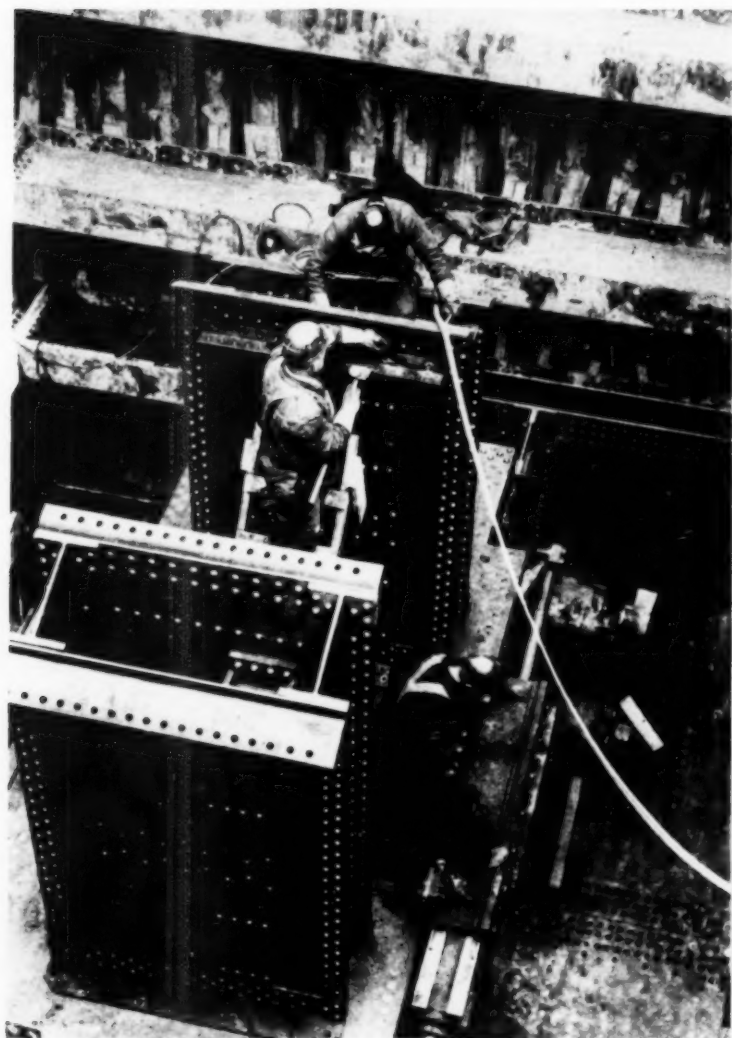
ASSEMBLED SHIELD at plant of William B. Pollock Co., in Youngstown, Ohio, weighs 190 tons. Cutting edge extends out from top half of shield.

and divided into six segments strongly braced by heavy H-beams running around the inside and bolted to heavy cross members.

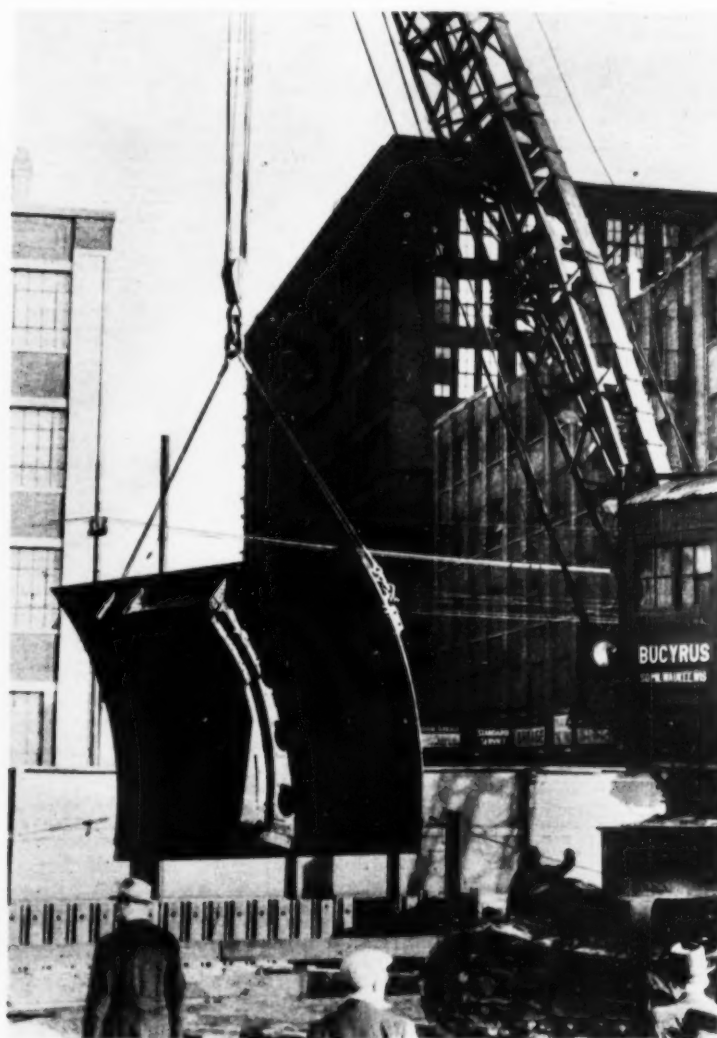
A semicircular hood with a cutting edge juts out 4 ft. in front of the top half of the shield. Six muck pockets are spaced in the breast of the shield, and in operation the miners cut the clay as it is squeezed through the pockets by the forward pressure of the shield. The clay is tossed backward into narrow-gauge muck cars for transport outside the tunnel. Twenty-four hydraulic jacks around the cutting edge shove the 190-ton shield forward. Each jack is capable of a maximum push of 200 tons and a total forward movement of more than 33 in. Twelve breasting jacks are distributed through the H-members that form the central bracing of the shield. These are primarily for safety in case the air pressure is released from the tunnel and additional mechanical pressure is required.

When the fabrication of the shield was finished, the sheet piling at the forward end of the shaft was burned out and the shield was started into the clay. A concrete plug containing an airlock

(Continued on page 103)



THREE SEGMENTS of 25-ft. diameter shield for Chicago subway are in place, and workmen are preparing to install cross-bracing for adding another segment. At right center can be seen two of hydraulic jacks for shoving shield.



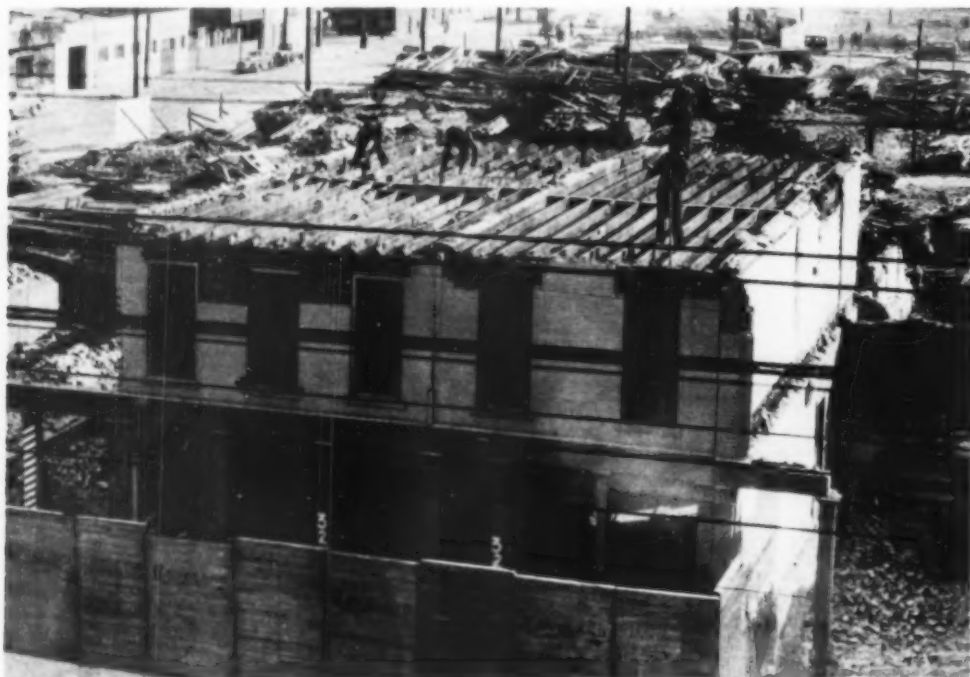
HEAVY REINFORCEMENT runs around inside of segment of shell of shield which is being lowered into steel-sheeted trench for erection. Four circular openings will accommodate 200-ton hydraulic jacks.

PUTTING CONSTRUCTION INTO *Reverse Gear*



A "PUSH-OVER" for the demolition crew is offered by walls above second floor from which good brick are recovered and cleaned for re-use.

DEMOLITION OF BUILDING (below) starts at roof and proceeds downward, after equipment and materials inside have been salvaged by "gutting crew."



How Cleveland Wrecking Company Organizes Its Work, Razes Structures and Salvages Materials for Re-Sale

SLUM CLEARANCE to provide sites for low-cost mass housing projects has been so widespread during the last few years that increased attention has been focused on the technique of wrecking old buildings. Active in this specialized field is the Cleveland Wrecking Co., with headquarters in Cincinnati, Ohio, and branches in nine other cities. How this organization has systematized its field practice, provided for the salvage and sale of usable materials and developed special methods and tools for razing old structures is outlined in the following notes, based on information obtained from S. G. Rose, vice-president of the Cleveland company.

Wrecking operations to-day involve two major functions: One is the actual demolition of the structures and the other is the salvage and sale of usable building materials. When a bid for wrecking is requested, a detailed field

survey is first made of the buildings to be demolished. It involves a complete inventory in which accurate quantities are determined. This inventory makes possible a calculation of the cubic contents of solid materials, in addition to footage and weights of structural members, such as lumber and steel.

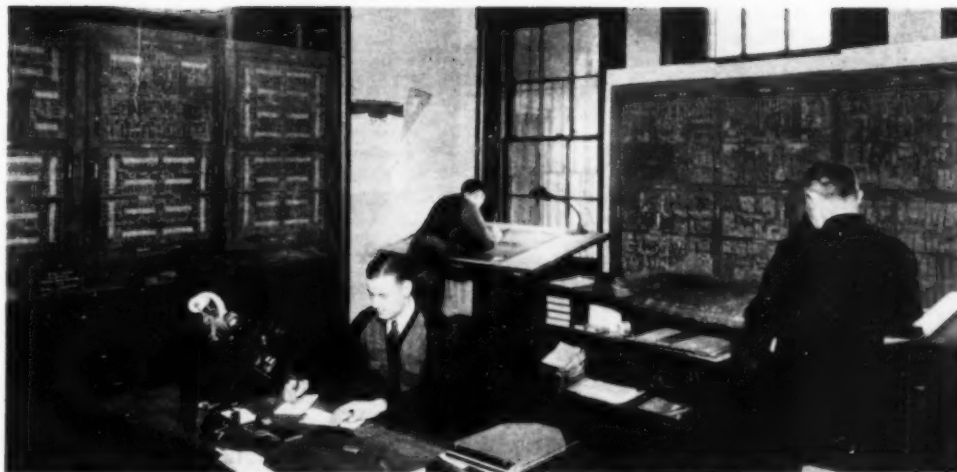
Each project presents its own problems. The total cost of a wrecking operation is predetermined from unit prices and these, in turn, depend on labor wage rates, proportion of manual to machine operation and conditions at site, such as accessibility, haulage distances and transport facilities. Other elements of cost that have to be included are insurance, supervision, watchman service, and protection of public by proper safety measures.

Bidders on demolition work generally are requested to take into consideration as part payment the value of the materials salvaged from the wrecking. This brings up the second component part of the operation—salvage and sales. Here again the inventory enters the picture. From the field survey, actual quantities are compiled and cataloged. Appraisers place a value on the salvage from this list of lumber, doors, windows, trim, steel, brick, plumbing and heating fixtures and any and all of the actually salvagable materials. Territorial and market conditions are carefully checked and from all of this information, together with the relation between the cost of work and salvage value, the bid is determined.

Job Organization

Before actual demolition begins, the job is thoroughly and completely organized and outlined on paper. A general progress chart is made and from it the relationship between physical bulk and man-hours is set up. Thus, it is possible to determine how many men, machines, and tools to put in the field from day to day. Upon notice to proceed with the work, a job and sales office site is selected and a complete job organization is set up. Heading this organization is the resident manager; directly under him and heading the two major branches of demolition and salvage are the general superintendent and the sales manager. Each has his respective assistants, including engineers, timekeepers, tool checkers, draftsmen, foremen, mechanical operators, salesmen, bookkeepers, stenographers and others.

A definite plan of procedure is established before any work is started. Every conceivable safety protection is provided and all barricades necessary for the safety of the public are erected prior to any actual demolition. All workmen are trained in their particular duties, all with a view to demolishing the buildings with the least possible chance of sustaining injury. Rules are made governing the actions of every man on the job. No man is allowed to work directly beneath another. Experi-



ENGINEERS' OFFICE. from which demolition work is directed, is equipped with maps, charts and progress schedules indicating exact, orderly, planned procedure of field operations.



TOOL ROOM AND TIME OFFICE are combined. Tools are checked in and out daily and inspected before being put back in racks so that workmen receive only sharp, safe tools.



SALVAGED EQUIPMENT (above and below) is cleaned, reconditioned, sorted and delivered to stock room for sale. At left, plumbing fixtures and at right millwork, including doors, mantels, etc.





OLD LUMBER is removed to yard and grouped into piles according to width, length and quality.



JACKING BRICK WALL is done with aid of crow-bar and inclined plank strut.



METAL ROOFING is loosened by special bars and best material is salvaged for re-use.



BRICK FROM RAZED WALLS are loaded into truck by clamshell crane, hauled to dumping ground where bats are removed and sound brick cleaned.

enced and competent superintendents, foremen and trained wreckers are employed to lay out every detail of the job.

Adequate first-aid facilities are maintained on every job, regardless of its size. Any injury, no matter how slight, is immediately reported to the proper authorities. Precautions are taken, even to the extent of examining clothing worn by the workmen. Torn clothing or loose, dangling parts of clothing are not permitted. No workman is permitted to work on a job unless his shoes have been previously examined and his gloves are of the proper and suitable type required for the work.

Various crews are set up, each under a competent foreman, and assigned to the various branches of work required. First, the gutting crews go through the building and remove all plumbing fixtures, electric fixtures, pipe, conduit, wiring, and all mechanical equipment and appurtenances. Second, come the

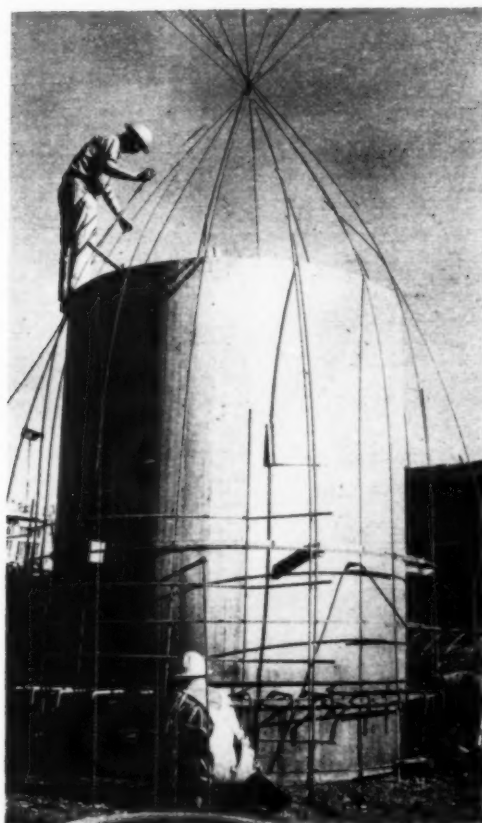
(Continued on page 110)



FLOOR BAR (left and above) is specially designed hand tool which loosens planking without destroying tongue and groove joints.

JOB

oddities

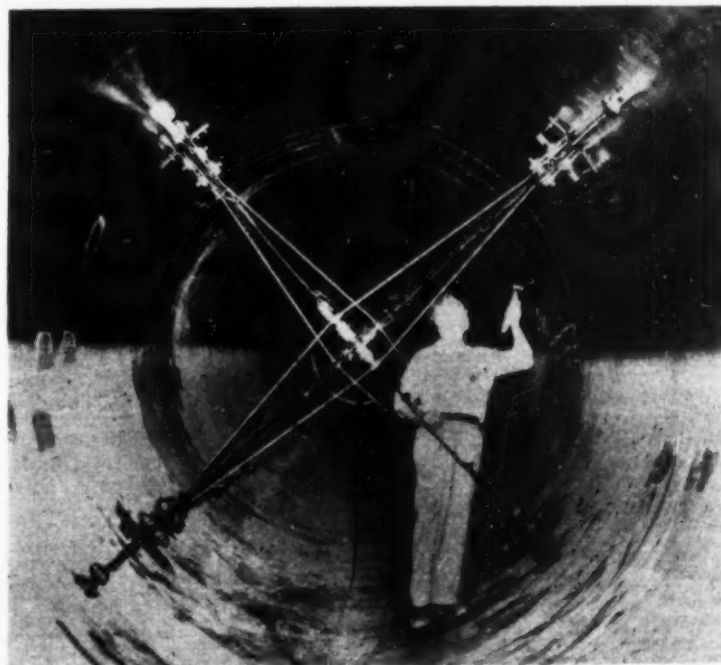


TENT OF STEEL IS WOVEN for framework of cable-control gallery at Grand Coulee dam in Washington. Interior of U. S. Bureau of Reclamation structure will be labyrinth of such galleries.



LIKE TALL LIGHTHOUSES ornamental concrete pylons illuminate spillway superstructure of Parker dam, U. S. Bureau of Reclamation structure on Colorado River, built to divert water into Colorado River aqueduct, California, and to develop electric power.

RUBBER PAVING BLOCKS (below) laid 16 years ago by Goodyear Tire & Rubber Co. in front of trucking entrance to its plant on busy street in Akron, Ohio, show little wear. Blocks 8x4x4 in., with tongue-and-groove joints on sides, were laid on 8-in. concrete base with 1/4-in. cushion of asphalt.



MEASUREMENT OF WATER discharged by Colorado River aqueduct pumps in California is accomplished by salt velocity method, involving principle of increased electrical conductivity in brine solution. At known distance apart two electrodes are placed within pipe receiving pump discharge. A "shot" of concentrated brine is injected into flow ahead of electrodes and its effect in increasing electrical conductivity is indicated by "humps" on chart recording flow. Velocity of flow is computed from time interval between humps on chart.



Fig. 1 . . . 9:30 A.M., FIRST DAY—Structural material has been laid out and erection of steel columns started for 30x80-ft. single-story change house at tunnel shaft.

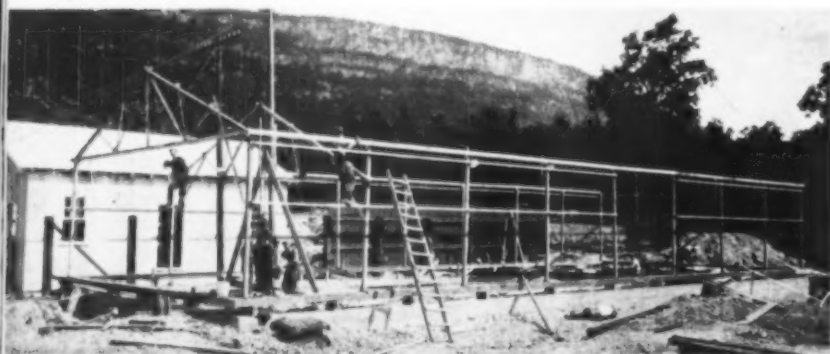


Fig. 2 . . . 10:30 A.M., FIRST DAY—Erection of steel roof trusses is begun with aid of A-frame and gin-pole rig.

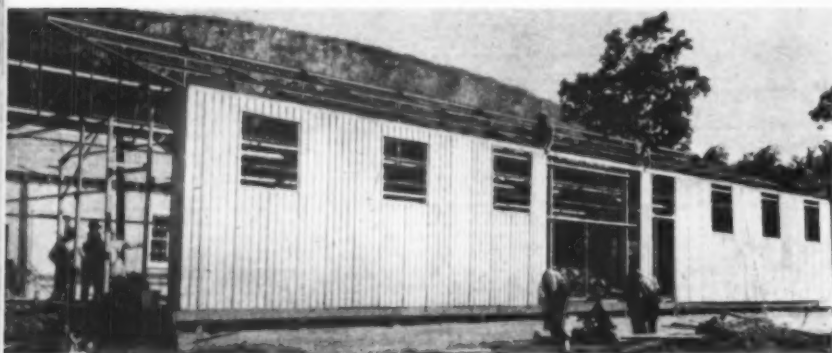


Fig. 5 . . . 9 A.M., SECOND DAY—Wall panels on one side of building are placed by two teams working toward center from opposite ends of building.



Fig. 6 . . . 10 A.M., SECOND DAY—End of building is closed in by sheeting in form of metal panels.

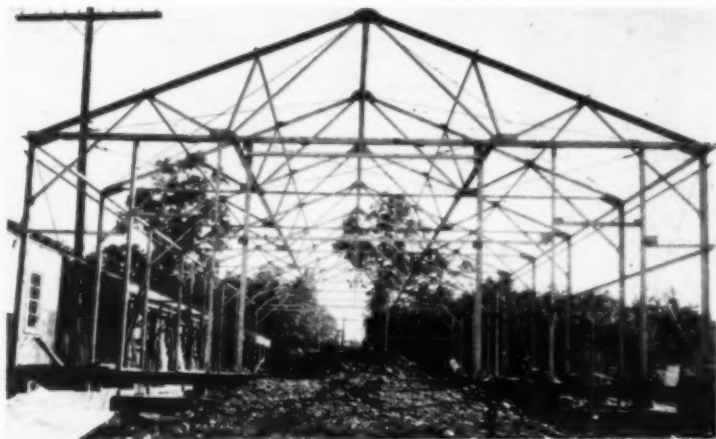


Fig. 3 . . . 8 A.M., SECOND DAY—Structural frame of building has been erected, using bolted field connections, preparatory to placing sheathing on walls and roof.

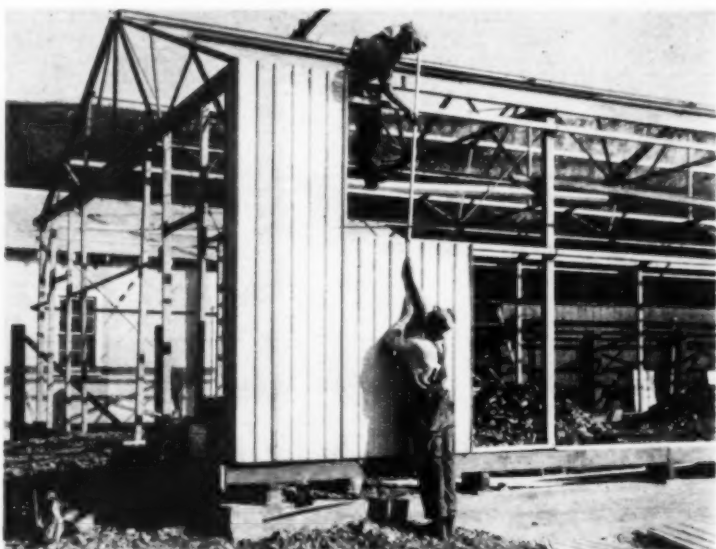


Fig. 4 . . . 8:15 A. M., SECOND DAY—Placing of metal wall panels begins, starting with corner sheet. Worker on top is placing interlocking cap section to join adjacent panels.

Step-by-Step

Field Methods

TUNNEL CONTRACTORS ERECT STANDARD STEEL BUILDINGS

In Jig Time



Fig. 7 . . . 9 A.M., THIRD DAY—Building is closed in on sides, roofing panels are distributed and lower course of roof sheets is installed.

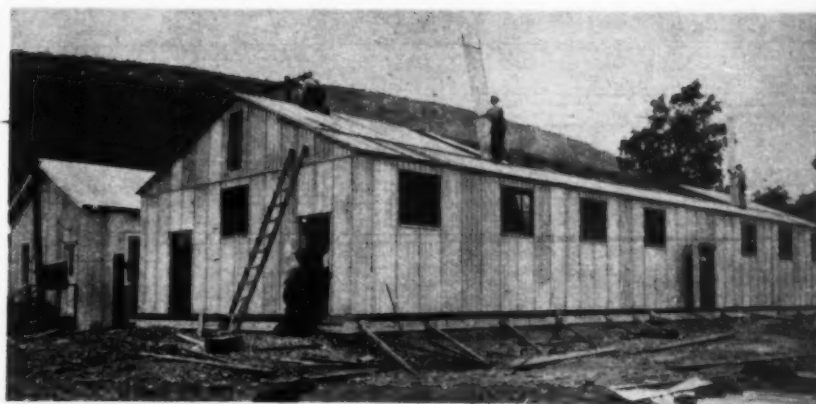


Fig. 8 . . . 11 A.M., THIRD DAY—While roofing is being completed workers have installed steel sash in window openings.

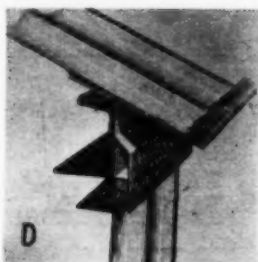
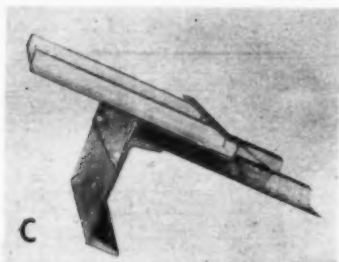
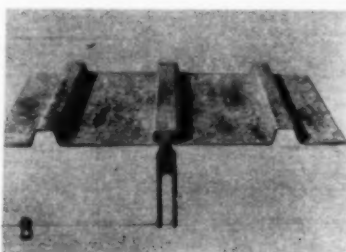
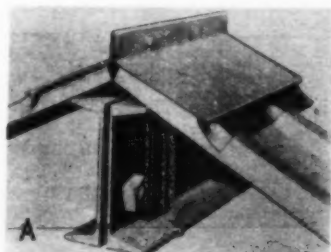


Fig. 10 . . . ROOFING AND SHEETING DETAILS. (A) Roof ridge, with lead flashing under ridge cap to insure weather-tightness; (B) Section through roof sheet, showing interlocking cap in place; (C) Roof joint channel; (D) Eave assembly.

FABRICATED IN UNITS designed for easy transport and speedy erection in the field, standard steel buildings to serve as change houses for tunnel workers and to house air-compressor plants, blacksmith shops and other construction service facilities, have been used extensively by contractors on New York City's \$273,000,000 Delaware River aqueduct, comprising a pressure tunnel 85 mi. long. Of eighteen buildings erected at this writing, including both one-story and two-story types, nine are in use by Samuel Rosoff, Ltd.; two by the Walsh Construction Co.; four by the Associated Contractors, Inc.; and three by the Seaboard Construction Co. The buildings, of Blaw-Knox design, are all-steel construction, with pairs of channels, back to back, serving as columns to support steel roof trusses. All field connections are bolted, so that the structures may readily be dis-assembled and re-erected at new sites. Sheathing and roofing are in the form of panels of copper-bearing steel sheets with the metal pressed into parallel ridges to serve as stiffeners.

At Shaft 3 on the Rosoff contract near the northerly end of the project, one of these buildings, a one-story change house 30 ft. wide, 80 ft. long and 10 ft. high from foundation to eaves, was erected in 168 man-hours by a crew of 1 supervisor and 7 men. Glazing required an additional 8 hr., bringing the total time to approximately 200 man-hours to complete the structure. This performance is said to represent average progress. The various stages in the erection of this building are illustrated in the accompanying sequence of photographs.

Starting work on a Friday at 8 a.m. the first crew hour

(Continued on page 114)



Fig. 9 . . . 3 P.M., THIRD DAY—Completion of 30x80-ft. building is marked by installation of doors and ventilators in roof.

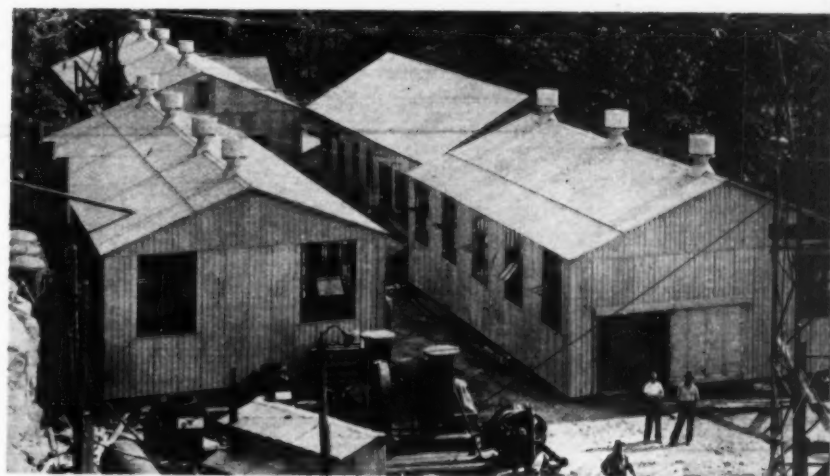
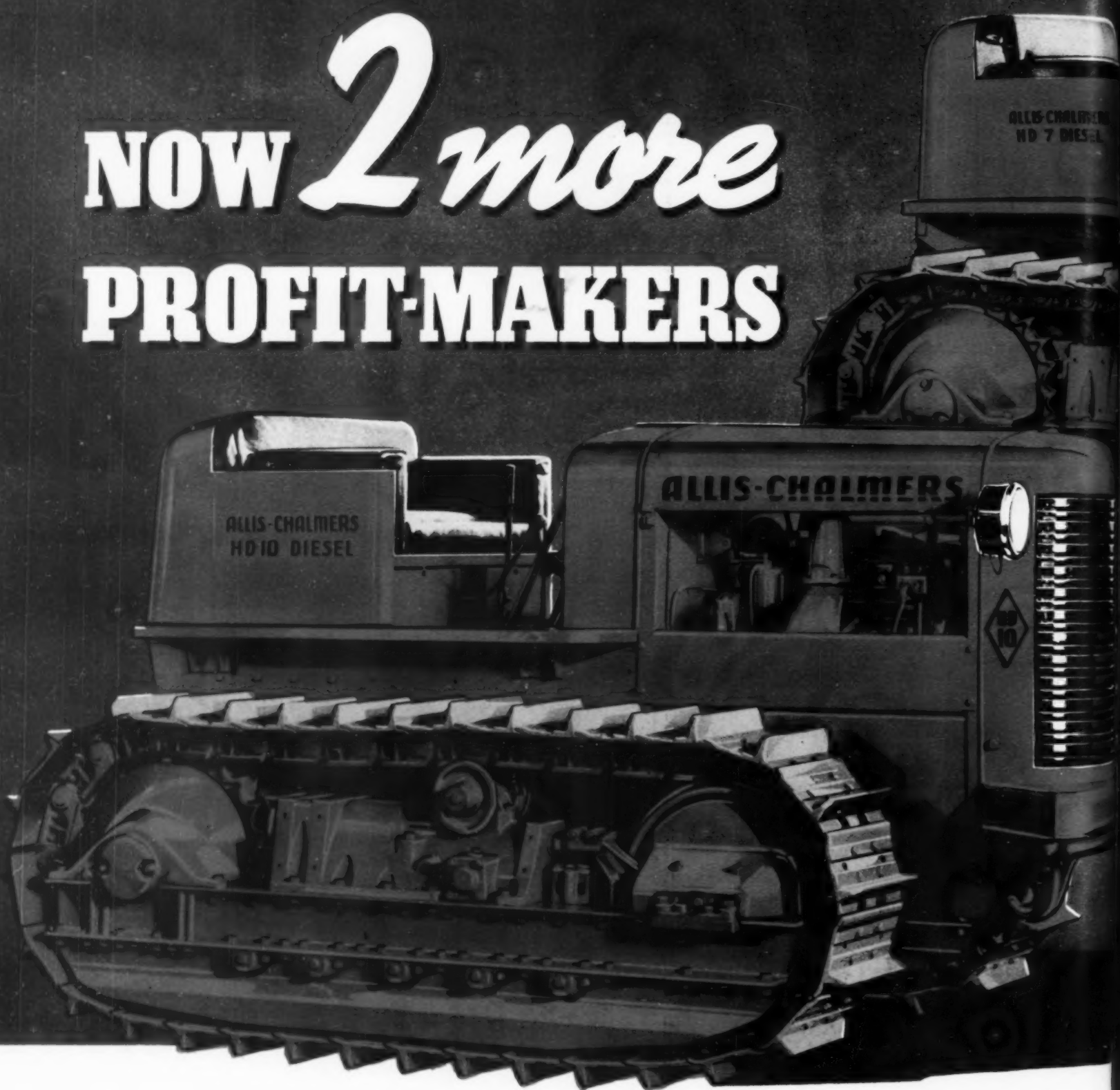


Fig. 11 . . . GROUP OF STANDARD STEEL BUILDINGS at top of Shaft 2 on Rosoff tunnel contract. Compressor house was erected under difficulties while air compressor units were being installed.



Fig. 12 . . . BLACKSMITH SHOP INTERIOR at Shaft 3, illustrates conditions of light and ventilation obtained.

NOW *2 more* PROFIT-MAKERS



Now the same revolutionary 2-cycle Diesel Power ... the same money-saving extra advantages ... that made the Allis-Chalmers HD-14 such an instant success are available to you in two new sizes—the HD-10 (71 drawbar h.p.) and HD-7 (54 drawbar h.p.). Select the tractor required by your power needs. No matter what your choice, you have a quick-starting, responsive, smooth-running Diesel tractor ... built to assure you profits, even on low bids and tough jobs. You have a powerful 2-cycle full Diesel engine, proved by thousands of dirt moving hours ... in mud, sand and rock ... in blistering heat and subzero temperatures. You

gain a big profit-making margin with Allis-Chalmers exclusive features—the Positive-Seal truck wheel assembly that requires lubrication only once in 200 hours ... “Long-Wear” bi-metallic clutches and brakes that outlast ordinary clutches and brakes several times over ... a new track release spring that materially lengthens track life.

Investigate this great line of Diesel tractors. See for yourself ... NOW ... how they can increase your profit margin. Your Allis-Chalmers dealer will gladly give you proof ... on your own job—you set the time.



HD-7 ... 54 drawbar h.p. ... 4 forward speeds, one reverse. Standard equipment includes electric starter and lights, muffler, full width crankcase guard, radiator guard, hour meter and adjustable radiator shutter.

HD-10 ... 71 drawbar h.p. ... 6 forward speeds, 2 reverse. Standard equipment includes electric starter and lights, bumper, front pull hook, adjustable radiator shutter, heavy radiator guard, hour meter, full width crankcase guard and muffler.

ALLIS-CHALMERS

TRACTOR DIVISION - MILWAUKEE, U.S.A.

2-cycle DIESEL Power

3 SIZES — HD-7, HD-10, HD-14
54 TO 108 DRAWBAR HORSE POWER

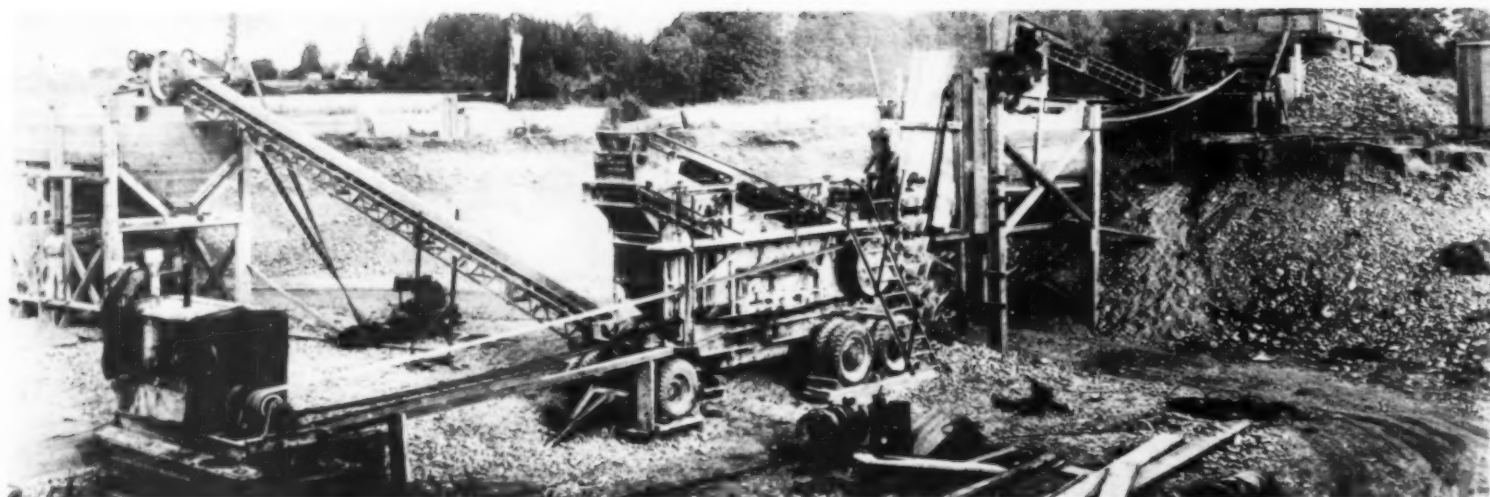
ADD TO YOUR PROFITS WITH THESE EXCLUSIVE FEATURES

- 1. GENERAL MOTORS 2-CYCLE DIESEL ENGINE** — Smoother, more compact ... 2-cycle design doubles power impulses, steps up horsepower, increases tractor responsiveness.
- 2. NEW SHOCK ABSORBER TRACK RELEASE** — Operates in oil ... sealed against dirt. Controlled spring tension automatically eases strain when stones or other objects get in tracks ... you get longer track life, less track repair expense.
- 3. POSITIVE-SEAL TRUCK WHEEL ASSEMBLY** — Requires lubrication only once every 200 operating hours ... cuts track roller and idler lubricant cost to *less than 1c per hour!*
- 4. "LONG-WEAR" BI-METALLIC BRAKES AND CLUTCHES** — Practically eliminate shut-downs for clutch and brake repair, even on tough night-and-day jobs.



DESIGNED TO LESSEN OPERATOR FATIGUE

All three Allis-Chalmers Diesel tractors have the cleanest decks and most comfortable tractor seats you've ever sat in. Their powerful 2-cycle engines really get down and hang on—no more see-sawing on steering levers to get your load in tough going. You have a lightning pick-up that keeps loads rolling at a fast clip ... that cuts out plenty of gear shifting ... that reduces arm weariness. Try it!



CRUSHED STONE FOR ROAD BUILDING in Pacific Northwest is produced by Yocum & Gill, Oregon contractors with portable plant mounted on truck equipped with pneumatic-tired wheels for quick shifts to new setups. Powered by Caterpillar diesel engine and equipped with primary and secondary crushers, anti-friction bearings, feed and delivery conveyors, this Austin-Western No. 100 unit, operated by 5-man crew on two 7-hr. shifts, produced 22,000 tons of rock crushed to 1-in. minus size in 28 days for private logging road. Crusher operation requires $4\frac{1}{2}$ to 5 gal. of diesel fuel oil per hour.

HOW

They Did It

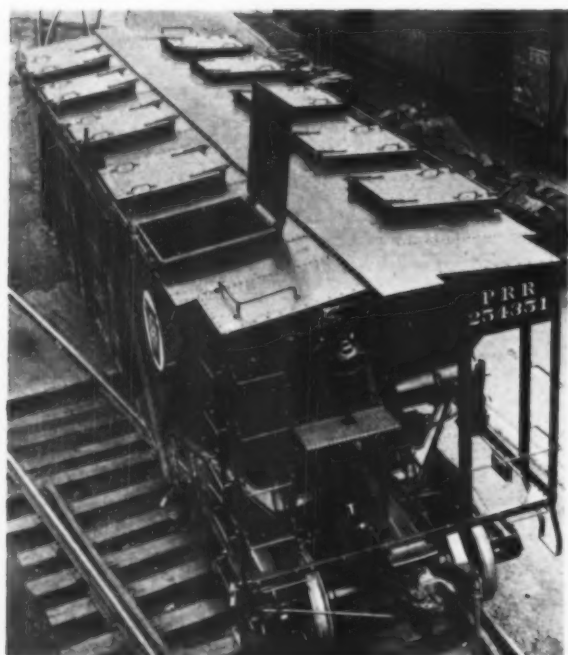
CONSTRUCTION DETAILS

For Superintendents and Foremen



International
Nickel Photo

REMOVAL OF TROLLEY POLES along Chicago surface lines is done with this rig consisting of rubber-tired tractor equipped with four 40-ton hydraulic jacks and clamps of cast nickel-alloy steel for gripping and raising poles set in concrete foundations. Use of Evansteel cast alloy steel for clamps has practically eliminated breakage under this type of severe service.



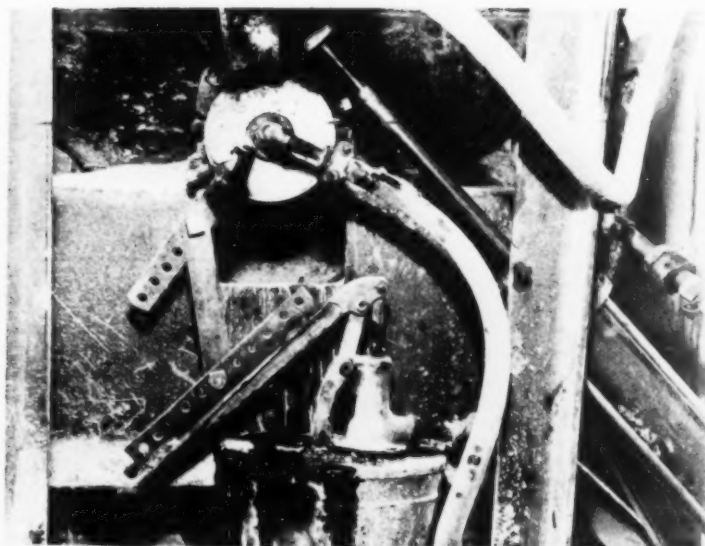
FOR TRANSPORTING BULK CEMENT Pennsylvania Railroad has designed this specialized type of hopper car with loading hatches which are watertight when closed. Cement is discharged from gates in bottoms of hoppers.



SPECIAL ROD HOIST for steel reinforcement raises and automatically dumps material at upper levels of new plant at Edgewater, N. J., built by The Austin Co., of Cleveland, for Hills Bros. Coffee, Inc. Device consists of V-shaped carrier (left), consisting of two hinged leaves, which rides on vertical timber guides. When hoist reaches top of its travel, one leaf drops down, (right) allowing steel reinforcing rods to roll off on to plank apron for delivery to points of use.



THREE-WHEELED CARRIAGE, mounted on pneumatic tires, provides mobile support for rapid maneuvering of hydraulic monitors used by Pacific Constructors, Inc., to wash out to solid rock foundation abutment keyways for Shasta dam, U. S. Bureau of Reclamation's main structure on Central Valley project in California. Water issues from 1¾-in. nozzle at pressure of 300 lb. per square inch.



AUTOMATIC GREASER of home-made design is used by West Construction Co. on railroad relocation project in California to lubricate center door bearing of twin-batch mixing plant. Each time air is admitted to ram at right, actuating piston which opens center door, grease gun gives bearing shot of lubricant.—Photo from HOWARD COLBY, Redding, Calif.



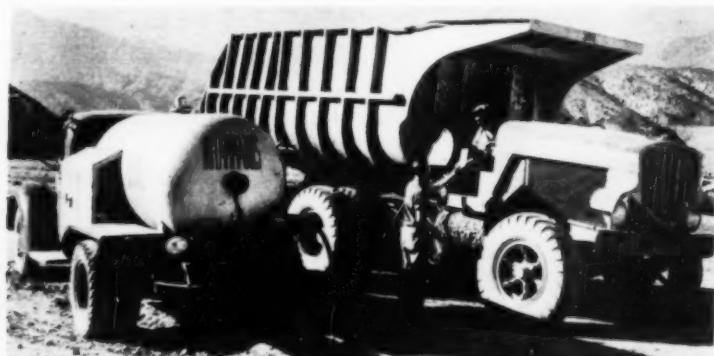
COMFORT FOR WORKERS being transported by truck to points where highway maintenance work is under way is afforded by this "top" designed and built in District 8 of Texas Highway Department, according to E. M. Belcher. Below top is combination seat and tool-box.



RINGS OF WELL POINTS in sandy soil make possible excavation in dry, without sheeting, for pumping station near shore of Lake Michigan, to serve 30-mi. pipe line of new water supply system for Grand Rapids, Mich. Header rings connected to Griffin well points, spaced 3 ft. apart, are installed in two lifts around 71-ft.-diameter pit. First lift enables excavation by clamshell on crawler crane to reach 25-ft. depth and second lift provides for digging to additional 18-ft. depth. Three pumps remove water from each header ring. Contractors are Owen-Ames-Kimball Co.

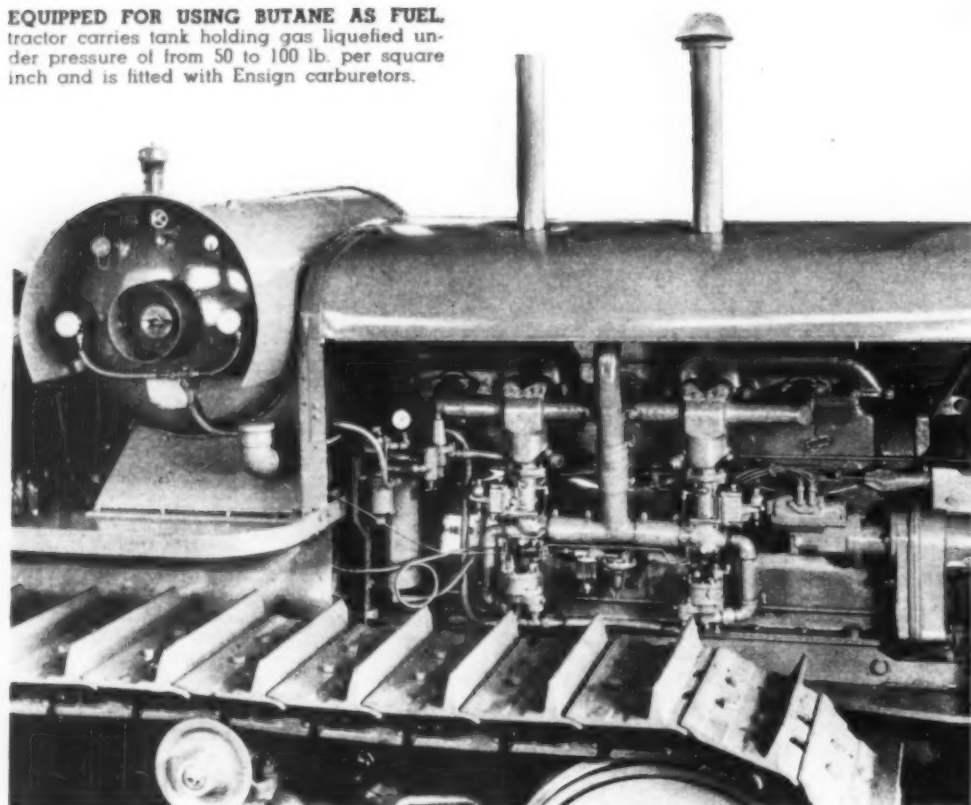


WHEEL ASSEMBLIES which are readily attached without necessity of getting under finisher facilitate movement of new Blaw-Knox gasoline-powered finishing machine between paving sections on Pennsylvania Turnpike contract of Shullo Construction Co., Akron, Ohio.



REFUELING OF 25-CU.YD. TRUCK with 60 gal. of Butane gas is done quickly by tank service truck at Shasta dam, U. S. Bureau of Reclamation project on Sacramento River in California. Note also special steel hoods to protect truck driver and engine during loading by power shovel.

EQUIPPED FOR USING BUTANE AS FUEL
tractor carries tank holding gas liquefied under pressure of from 50 to 100 lb. per square inch and is fitted with Ensign carburetors.



Butane Gas as Tractor Fuel

SHOWS ECONOMIES ON ROAD-BUILDING JOB

ON A ROAD BUILDING JOB in Page and Mills Counties, Ia., Hudkins & Perry, contractors, in an effort to lower costs and increase yardage of tractor-scraper grading operations, replaced their diesel tractors with new tractors equipped to burn butane gas fuel. From the Allis-Chalmers Manufacturing Co., which supplied the tractors used on the project, the following notes and comment on the experience with butane as a tractor fuel have been received:

Butane gas or commercial butane is a mixture of about 80 per cent butane and 20 per cent propane. Butane and propane are petroleum gases at atmospheric pressure. Both are more volatile than gasoline, propane being the more volatile of the two. These two gases are liquefied by pressure to facilitate storing and handling, but are utilized as a gas in the usual manner through a carburetor. Propane is added to give better starting because it vaporizes more readily. More propane is added in cold weather than in warm weather.

Butane is claimed to be an ideal tractor fuel because of its high octane rating and clean burning characteristics which leave no carbon deposit nor crankcase dilution. The premium gasolines today have an 85 octane rating, whereas butane rates 100 or higher, giving a noticeable increase in power in engines designed specifically for this fuel. Hudkins & Perry changed engine oil only every 400 hr. in the butane tractors, but had to change oil every 50 hr. with diesel tractors. They estimate that the life of pistons and cylinder liners has been increased 300 per cent and that a large saving in lubricating oil and maintenance expense is effected. Two complete motor overhauls are saved, cutting labor and material costs and



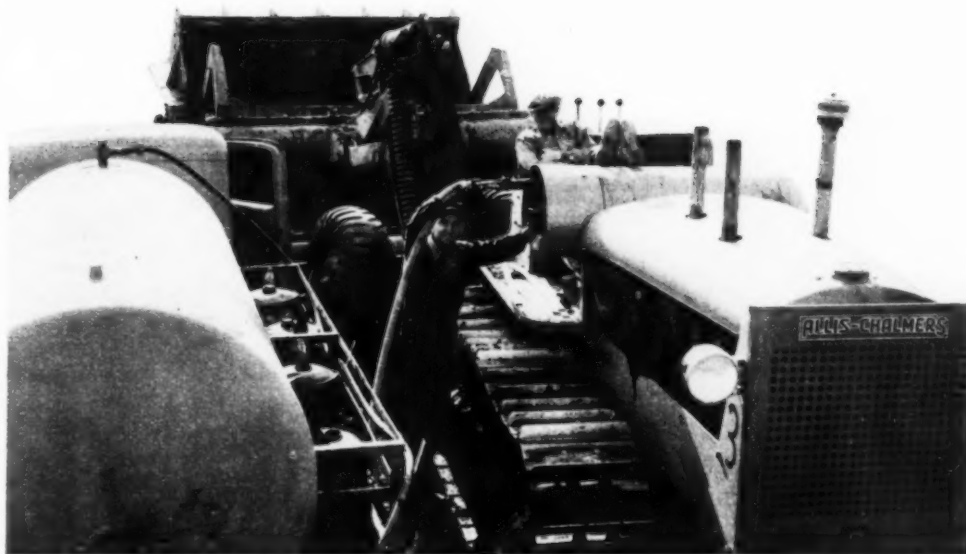
ROAD GRADING with tractor-scraper units operating on butane fuel involve use of pusher tractor to speed loading of 12-yd. scraper.

keeping the tractor on the job without lost time. Overhauling a butane-burning engine is said to cost considerably less than a similar job on a diesel engine, thus offering an added savings.

The tractors ran continuously for more than four months, 24 hr. a day. The only time they were shut down was for greasing and refueling which took half an hour a day. Mr. Hudkins states that his yardage output is increased because the tractors are down for repairs only an insignificant percentage of their working time.

The equipment on the Iowa job consisted of four Allis-Chalmers butane L tractors pulling L-12 Gar Wood scrapers with built-up side boards and pusher assembly. The two pushers were butane L tractors and there were also two other butane L tractors—one pulling an elevating grader and one a Model 112 Allis-Chalmers leaning-frame grader. Pay load on the scrapers averaged 11 cu.yd. The fuel consumption was between 7 and 8 gal. of butane per hour which is comparable with that of a gasoline tractor.

To obtain maximum power and economy using butane as a fuel, the tractor engine, its makers point out, should have an 8:1 compression ratio and large, cool intake manifolds. Ordinary gasoline engines which are converted to burn butane seldom have more than a 5½:1 or 6:1 compression ratio and the small manifolds, mounted close to the engine, as is necessary for gasoline



TRACTOR FUEL TANK is charged with butane through hose line from tank truck.

operation, are neither large enough nor cold enough to give maximum efficiency when operating on butane. Thus maximum power and economy are not obtained with the gasoline conversion, but butane still is claimed to have many advantages.

Butane equipment may be installed on new tractors as original equipment or tractors already in operation can readily be converted to operate on new fuel. Because butane is stored and transported as a liquid under pressure, special tanks and equipment are necessary to handle

it. However, with the proper tanks, hose and fittings, there is no more danger in handling than with ordinary liquid fuels.

The tractor fuel tank holds the butane at from 50 to 100 lb. per square inch pressure. The liquid butane must be converted to a gas at atmospheric pressure before it enters the carburetor. This is done by allowing the butane to expand through a pressure regulator into a vaporizer. Both of these units are heated by the engine cooling water to

(Continued on page 108)

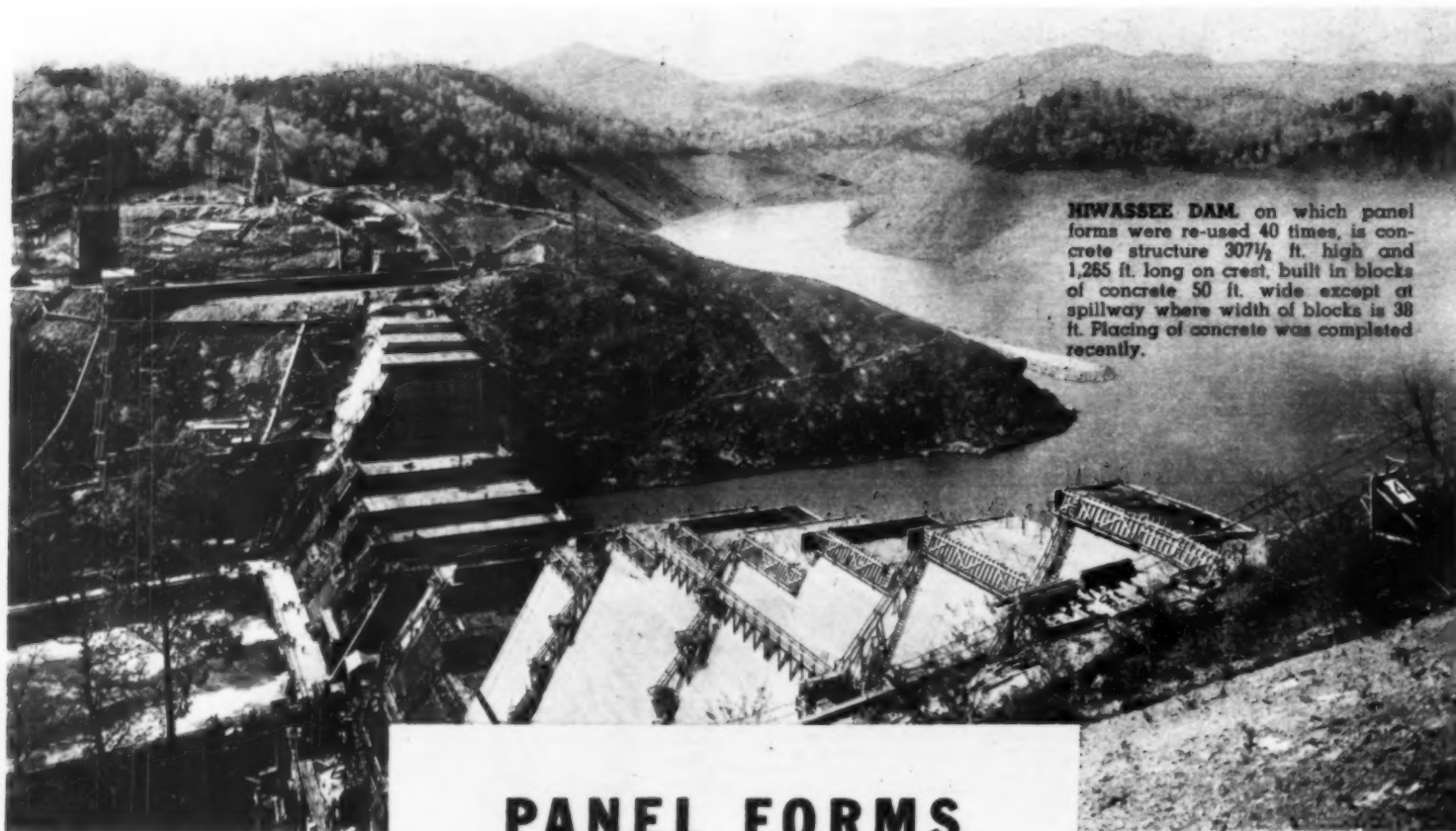
Open Web Framing Supports Floors in New Woolworth Stores

F. W. WOOLWORTH CO. is employing open-web long-span joists for the support of floors and ceilings in new stores and additions in its Philadelphia operating district. This type of construction has been extensively used in recent years for roofs in such structures as theatres and garages where wide floor spaces free of columns are desirable, but this is one of the first examples in which it has been employed for floor and ceiling support. The open-web members, as employed by the Woolworth stores, saved erection time, and since it was mandatory that ceilings should be flat and free from protruding air-conditioning ducts or incased beams, a saving was also effected in the ceiling height.

(Continued on page 116)



DUCT WORK RUN CROSSWAYS to open-web member provides space for housing air-conditioning equipment, saving 3 to 4 in. in ceiling height.



HIWASSEE DAM on which panel forms were re-used 40 times, is concrete structure 307½ ft. high and 1,265 ft. long on crest, built in blocks of concrete 50 ft. wide except at spillway where width of blocks is 38 ft. Placing of concrete was completed recently.

PANEL FORMS

Cut Setting and Stripping Costs

AT HIWASSEE DAM

By J. E. WALTERS

Construction Superintendent,
Tennessee Valley Authority

A SINGLE-COURSE PANEL FORM which effected marked reductions in setting and stripping costs was developed and used at Hiwassee dam, a Tennessee Valley Authority project on the Hiwassee River in North Carolina on which concrete placement was recently completed. The dam is a concrete structure of the straight, overflow, gravity type, having a crest length of 1,265 ft. and a height, from lowest excavation on the axis to the roadway, of 307.5 ft. This height makes it possible to obtain a large number of re-uses from panel forms and extensive studies were made to develop a form that would assure the lowest possible costs. The normal concrete pour used is 5 ft. in height.

Approximately 25,000 sq. ft. of panel forms were fabricated. Each panel is re-used approximately 40 times. The upstream and downstream panels are made 2 in. shorter than the full width of the blocks to allow the bulkhead panels to project by the end panels. The blocks of the dam are 50 ft. wide, with the exception of those in the spillway section which are 38 ft. wide, with one 32-ft. block. Bulkhead panels, for use along the sides of the block, are 48 ft. long, with a few panels 32 ft. and 16 ft. long to be substituted on the downstream end when the longer lengths project too far beyond the sloping downstream panel.



J. E. WALTERS, construction superintendent for TVA on Hiwassee dam.

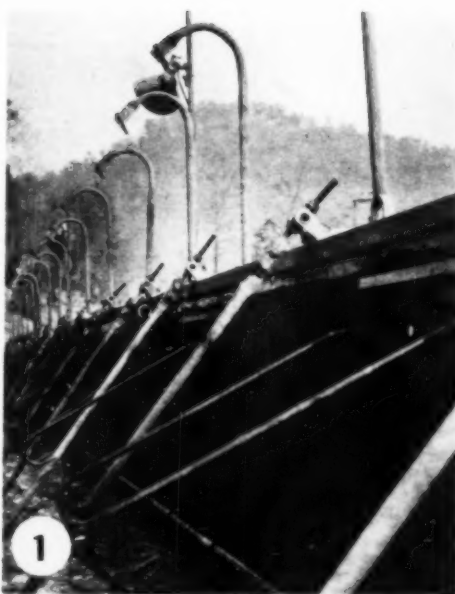
Panel forms are raised by aluminum A-frames and Coffing hoists of the ratchet-lever type. When it is necessary to substitute shorter bulkhead forms because of the sloping downstream surface, the exchange is handled by means of the cableway. The accompanying drawing shows a typical section of a standard panel form and the hardware now being used.

A 10x3½-in., 21.9-lb. ship channel is employed for the top wale to allow the use of a movable top lug or tie attachment and eliminate the need of placing tierods through the face of the form. These channels were previously used on panel forms at Pickwick Landing dam of the TVA and salvaged. A similar single channel is used for the bottom wale with a 4x8x30-in. oak filler wale below the bottom sleeve bolt to distribute the load to the channel. This short wale is removable to allow ample working space for installing the bottom anchor bolt and eliminates the need of accurately spotting the panel to place the anchor bolt as is necessary with double wales or slotted timber wales.

Although the studs extend below the bottom wales, the form is not lagged below this point, in order to avoid bringing the bottom tie-bolts through the lagging and thus making it possible to shift the panel horizontally, when necessary, without affecting the alignment of these tie-bolts.

Each stud has a 4x16x1 3/16-in. filler fastened to the face below the 1 5/16-in. lagging. This filler being 1/8 in. thinner than the lagging causes the panel to lean backward slightly when the bottom anchor bolts are tightened, thereby putting all of the top anchors in tension when the form is brought to accurate alignment. A 1 1/4x1 3/4-in. angle is located directly below the 1 5/16-in. lagging to carry the load of the panel on the bottom anchors without cutting into the lagging. Sleeve bolts 1 3/8 in. in outside diameter are used for bottom ties and are screwed over long 1-in. J-rods embedded in the previous pour for this purpose. These J-rods are longer than usual due to the fact that the type of cement used at Hiwassee dam has a lower early strength than standard cement.

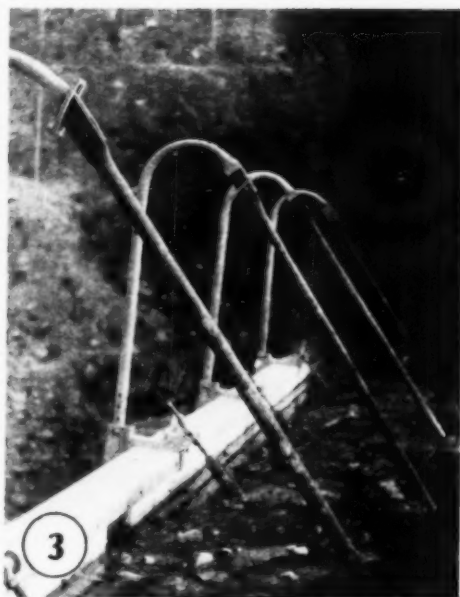
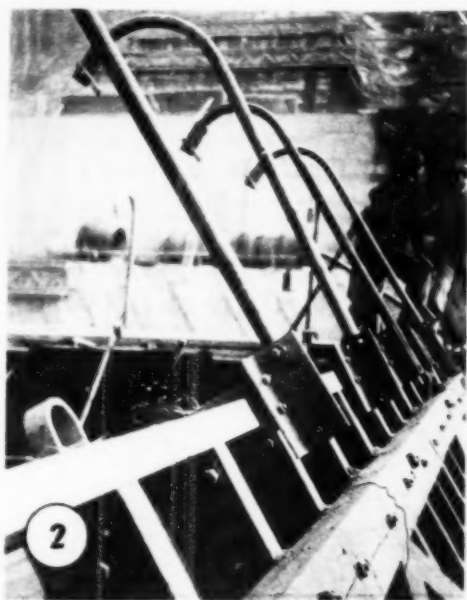
The 6x6-in. wale near the top of the



templet is slotted in both directions so the templet can be plumbed, thus assuring the accurate location of the anchor pipe when the form is raised to its new position. Very little difficulty is experienced in protecting the templates while concreting, as they are directly over the forms.

Combination Strut and Tie Pipe—Used tubing, cut to lengths of 8 and 9 ft., was purchased as tierods for sloping forms and for bulkheads, respectively. This pipe is pinched together at the embedded end to facilitate its installation and slightly deformed at that end to increase the bond strength.

The opposite end is flattened for approximately 8 in. and two 13/16-in. holes are punched on 3-in. centers. The tubing is flattened and punched in the machine shop before delivery to the job. A special die was made to fit a Williams



FORM ANCHORAGE DETAILS and hardware employed. (1) Tie pipes connected and form lined up. Gooseneck templates in place to support anchor pipes for next lift. (2) Gooseneck pipes fastened to movable lugs. (3) Anchor pipes from goosenecks embedded in concrete for next lift. (4) Movable top lug and connector allows pipe tie to be set at any angle.

panel is used only for supporting the templet bolts and to keep the panel from racking out of shape. The top templet bolts have the same taper on the embedded end as the bottom bolts and are the proper length to locate the J-rods when the nut is placed tight against the 6x6-in. wale.

Gooseneck Pipe Templet—Past experience has proved that anchors set in the top of concrete pours, even though set with a special templet measured from the form, would sometimes vary or be moved out of place enough in cleanup to necessitate a special length rod or pipe tie. This, of course, caused delay while adjustments were made. Provision has been made on the panels now in use to bolt a gooseneck templet to the back of the movable lug on the top wale. This templet accurately locates the combination strut and tie pipe used for a top anchor, and holds the pipe in place until the concrete has set up. The angle which supports the gooseneck

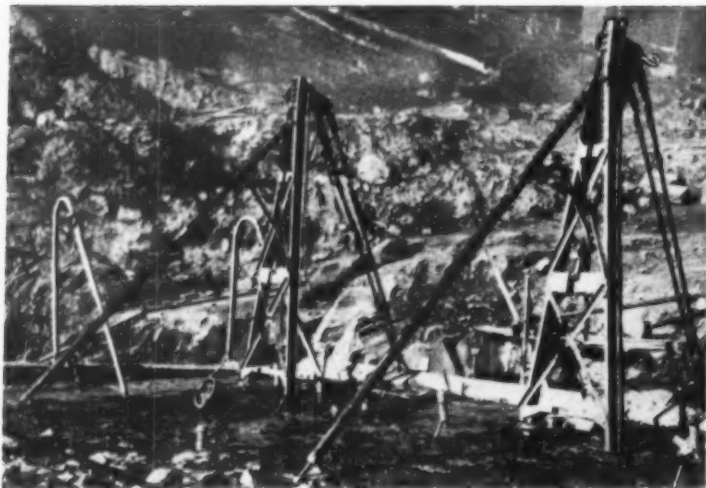


SAFETY SCAFFOLD is hung below back of panel forms to provide working platform.

punch and shear, and the tubing is pinched together at one end, deformed near that end, flattened on opposite end and holes punched by use of the one die at the rate of one complete pipe per minute.

The anchor pipe is embedded approximately 18 in. in the top of the concrete pour. The other end is supported on the gooseneck templet so the pipe is accurately located. Very little difficulty is experienced in forcing the pipe ties into the concrete as they are placed as soon as the concrete is brought to grade. A vibrator is run near the pipe, while being placed, to assure a good bond.

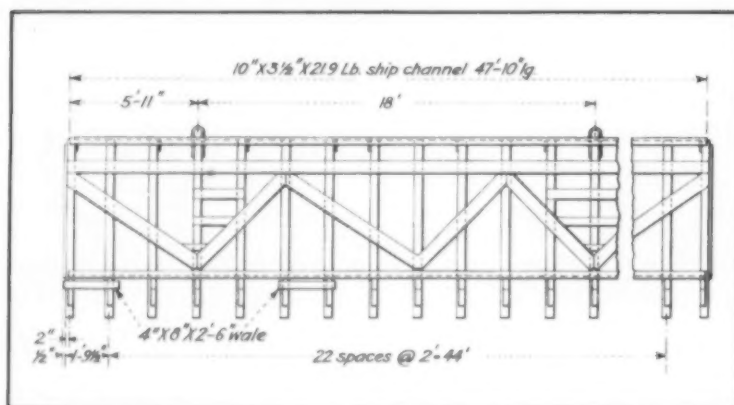
When the form is raised for the next lift, connection is made to this pipe by use of a tie link, consisting of a 1x14-in. threaded rod welded to a clevis. The clevis fits over the flattened end of the combination pipe strut and tie and is fastened with two 3/4-in. bolts through the clevis and pipe. The 1x14-in. bolt is threaded full length and by use of wash-



LIFTING OF PANEL FORMS is done with aluminum A-frames and ratchet lever hoists which pick up panels by U-bolts in top flange.

ers and nuts on each side of the movable lug fastened to the top wale, it is possible accurately to align the forms and hold them in place while concreting.

The combination strut and tie pipe when made up costs less than 1-in.-diameter rods and serves the dual purpose of strut and tie for the top of the panel forms. All hardware used in connecting the pipe to the form is above the pour grade and salvaged. The expected life of the hardware is longer than for the balance of the panel forms. Concrete is placed in the forms by means of a 7-yd. bucket handled by

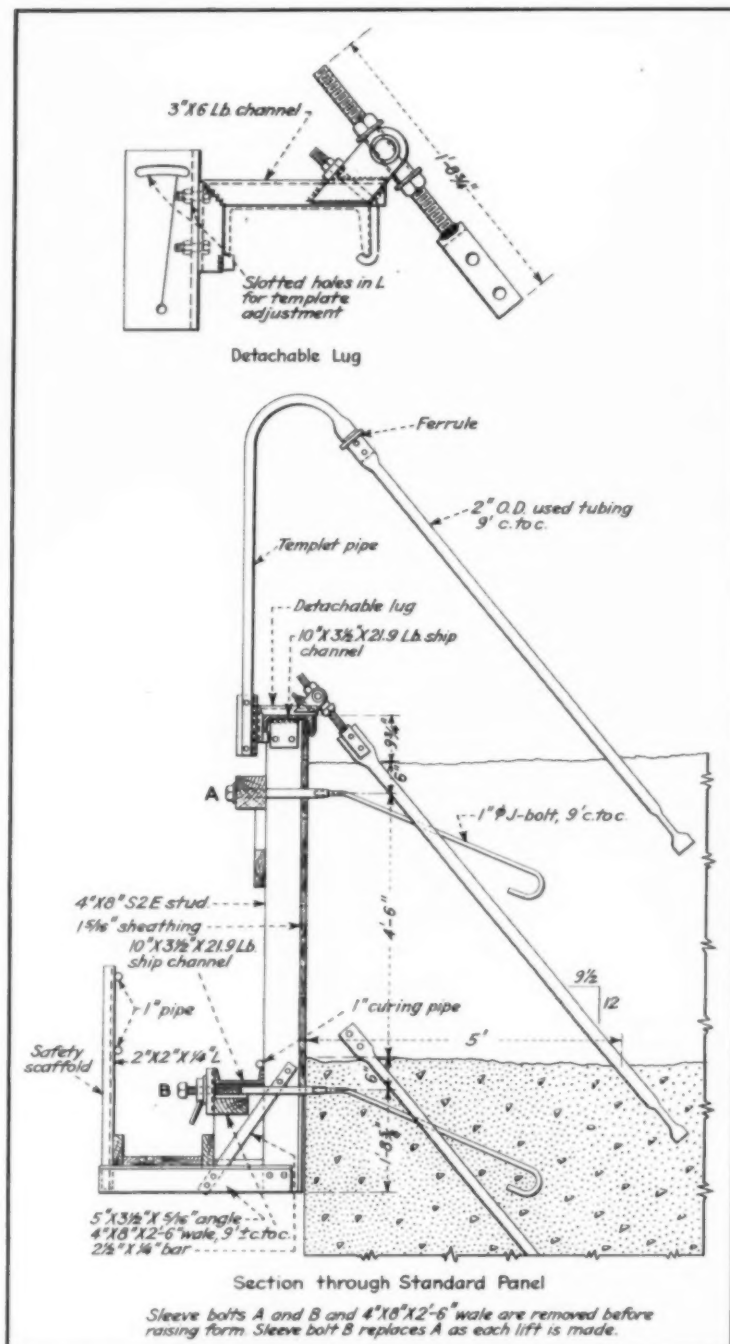


BULKHEAD PANEL for use along sides of concrete block is normally 48 ft. long, with 4x8-in. studs on 24-in. centers.

cableway, but no difficulty has been experienced due to knocking out or bending of the pipe anchors.

Attached Scaffolds—The safety scaffolds are permanently fastened to each form and furnish a stable work platform for the workmen engaged in handling the forms. The angle iron and pipe frame work combined make a strong, inexpensive installation and one that is easily repaired if the concrete bucket accidentally hits it. The added production of the workmen when working from an adequate safety scaffold will more than pay for the installation. A perforated 1-in. pipe is located on the back of the studs above this scaffold to supply curing water to the concrete face.

Organization—The panel forms as used on this project are the result of an evolution of the forms used by the various construction projects of the Tennessee Valley Authority, improvements being progressively made and passed on by each project. The more important improvements in the present forms are the use of the pipe templets and the embedding of the combination tie and strut directly in the concrete, together with the special attachments which insure the successful and economical operation of the forms. These features were developed by the writer, assisted by H. W. Hunt, form-



DETAILS OF STANDARD PANEL of wood forms designed for pouring 5-ft. lifts of concrete. Forms are raised by A-frames and ratchet-lever hoists.

erly with the Construction Plant Division of the Tennessee Valley Authority, and the project engineering forces, together with suggestions from the carpenter foremen of the project. Plans and details of fabrication were prepared by the project engineering forces. Theodore B. Parker is chief engineer of the Tennessee Valley Authority in general charge of all engineering and construction. A. L. Pauls is chief construction engineer. Project officials of Hiwassee dam are C. E. Blee, project engineer, O. Laurgaard, construction engineer, and J. E. Walters, construction superintendent.

★ ★ ★

COLD IMMERSION CLEANER

FOR CLEANING AUTOMOTIVE PARTS the Bendix Products Division of Bendix Aviation Corporation has developed a cold immersion liquid cleaner said to be fireproof, non-toxic and non-corrosive, which removes dirt, grease, carbon and gum and will not blacken, pit, attack nor eat any metal or alloy. Available in 2- and 5-gal. cans.

Present and Accounted For

A PAGE OF PERSONALITIES



JOHN C. RIEDEL is new president of National Society of Professional Engineers, elected at annual convention in Columbus, Ohio, Feb. 8-10. Mr. Riedel is chief engineer of Board of Estimate, New York City.



WILLIAM L. CROW, 29-year-old president of William L. Crow Construction Co., of New York City, and great-grandson of its founder, was guest of honor of New York Building Congress at a party Feb. 1 to celebrate 100 years of unbroken building activity by Crow organization, established in 1840 by Langstaff N. Crow. During its century of existence the company has done \$93,000,000 worth of building construction.



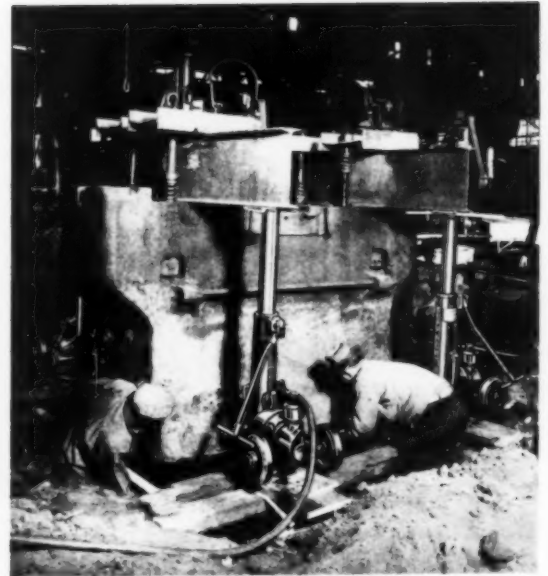
HAL G. SOURS, assistant director and chief engineer of Ohio Department of Highways, was elected president of American Road Builders' Association at its thirty-seventh annual convention in Chicago, Jan. 29-Feb. 2. He succeeds Murray D. Van Wagoner, State Highway Commissioner of Michigan.



COL. FLOYD E. EVANS (right) is first president of American Road Builders' Association's newly created Airport Division. Col. Evans is director of Michigan State Board of Aeronautics.



HEADS OF THREE CONSTRUCTION DIVISIONS of Associated General Contractors of America, appointed at recent annual meeting in Memphis, Tenn., are (left to right): Heavy Construction Division, **OSCAR B. COBLENTZ**, McLean Contracting Co., Baltimore, Md.; Building Division, **DELL E. WEBB**, Webb Construction Co., Phoenix, Ariz.; Highway Division, **F. W. PARROTT**, C. F. Lytle Co., Sioux City, Ia.



1

1 FOR LIFTING 30-TON LOAD in form of anvil, from its base four Duff-Norton rotary motor power jacks, operated by compressed air, prove effective. Jacks are equipped with rubber-tired wheels for trundling to new setup.



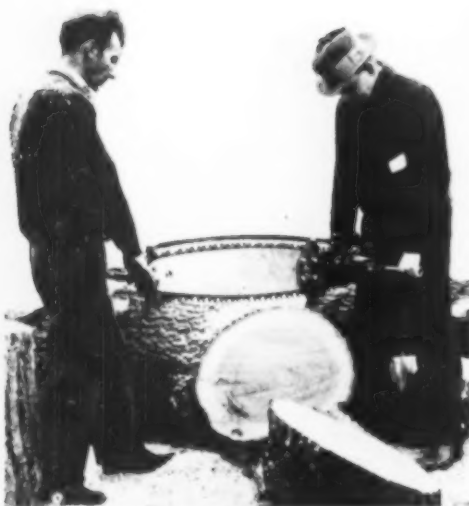
2

2 TUNNEL LINING BOLTS joining cast-iron rings of 31-ft.-diameter Queens-Midtown subaqueous twin tubes, New York City, are tightened by workers of Walsh Construction Co. with heavy-duty Lowell ratchet wrench, equipped with 5-ft. handle for high leverage.



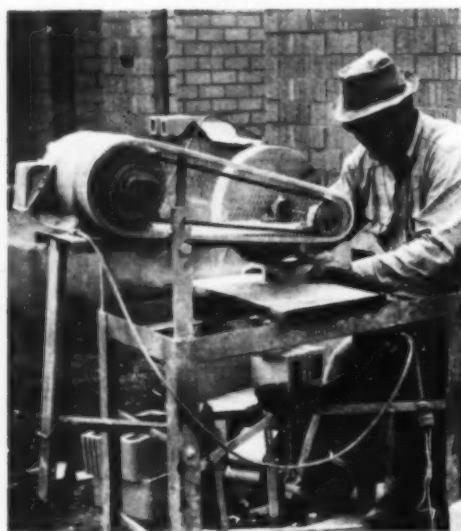
3

3 DRIVING OF SCREW SPIKES into wood ties of street railway tracks in Philadelphia is done with Chicago Pneumatic power wrench, equipped with slow-speed compressed-air motor. Attachment on wrench, devised by John W. Mathias, keeps tie-clip from turning and tie from swinging as spike is screwed into place.



4

4 PNEUMATIC CHAIN SAW is designed for tree felling, cutting large timbers or wood piling either above or below water. New Mall unit weighing 50 lb. is equipped with 3.5-hp. air motor operating at 90-lb. pressure and consuming 95 cu. ft. of air per minute. Cutting capacity, 24 in. Free speed of chain 1,000 ft. per minute.



5

5 MASONRY SAW cuts tile to fit needs of masons on Santa Rita housing project in Austin, Tex. Equipped with abrasive disk, Clipper unit is designed with hand and foot control to make cut in plain view of operator. Motor is protected from dust resulting from cutting operation.



1 SAW-TOOTH TROWEL applies adhesive compound to bond Presdwood panel to plastered wall. Semicircular motion of trowel is recommended in applying adhesive.



2 BEVELING TOOL has adjustable cutting knife to produce different degrees of bevel. It is recommended that large cut be taken first from section beveled and then a fine trim cut as a second operation.

Fiber Board Products

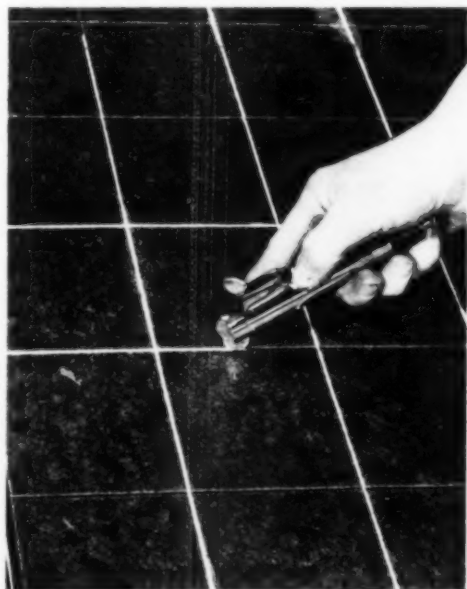
WORKED WITH AID OF VARIOUS

Small Tools

THE ACCOMPANYING PHOTOGRAPHS illustrate typical applications in building construction of various small tools in the installation of Masonite insulation board and other fiber board products, including Presdwood and Quarterboard.



3 GROOVING TOOL is held at slight angle and drawn across Presdwood board for making shallow cut. Operation is repeated for scorings of greater depth.



4 STRIPING TOOL has barrel filled with paint to produce markings simulating tile. Revolving head transfers paint from barrel to grooves scored in fiber board panel. Tool is equipped with two different sizes of head.



5 CUTTER KIT has three wood block planes for use in working structural insulation boards. Each plane handles individual operation such as (1) slicing, (2) beveling, and (3) V-grooving.



6 ALL-METAL BEVELING TOOL of Stanley design has variety of uses on Masonite products, including beveling, V-grooving, slicing and giving insulation board various joint treatments, such as shiplapped.

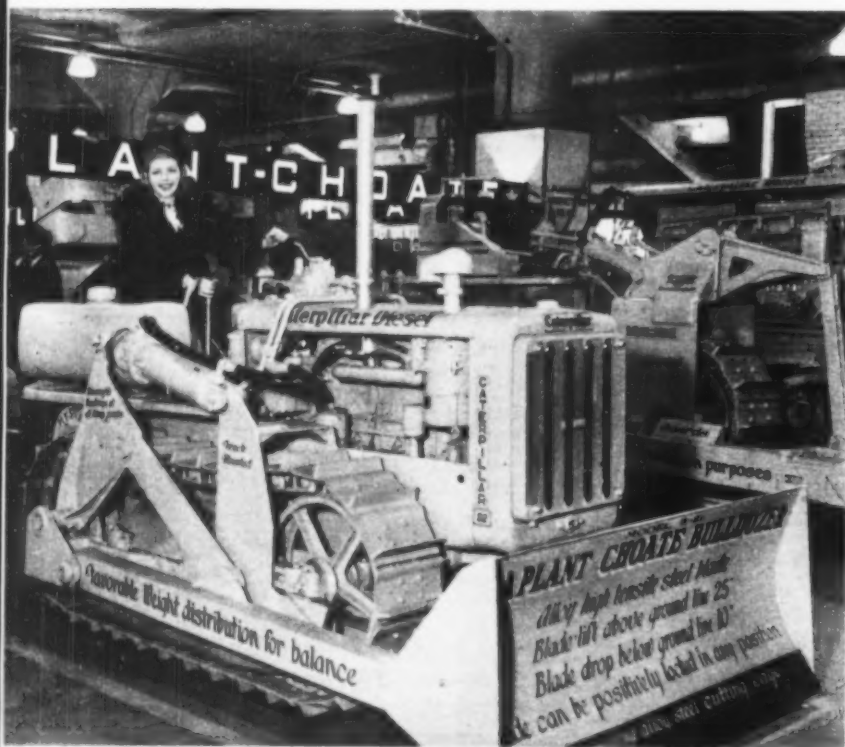


SQUAD OF SCOTCH LASSIES, symbolizing thrift of tractor operation, are perched atop big new 95-hp. diesel Cletrac to lend color to exhibit of Cleveland Tractor Co. Also in picture at lower right, in case your attention has been focused elsewhere, is Bill Miles, company's industrial sales manager.

Echoes FROM THE

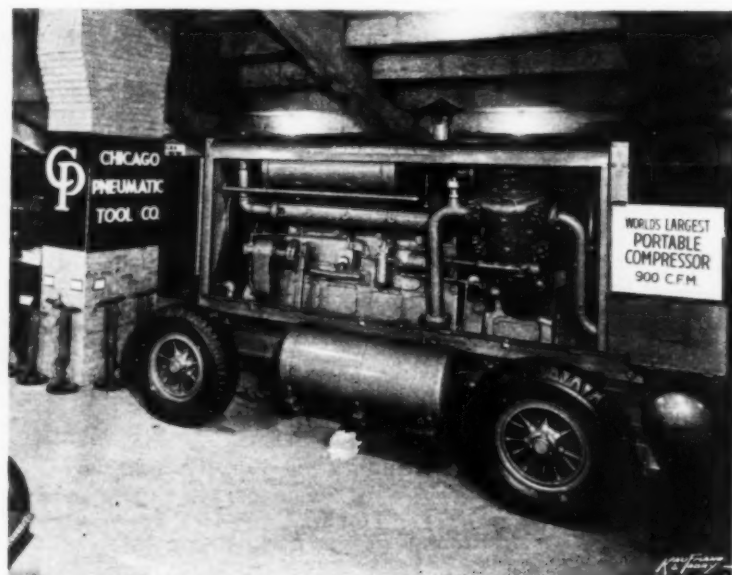


LARGEST GASOLINE-POWERED TRUCK at Road Show, according to its manufacturer, was 8-cu.yd. dump-body Diamond T model, with gross capacity of 40,000 lb. It carries a 100,000-mi. guarantee.

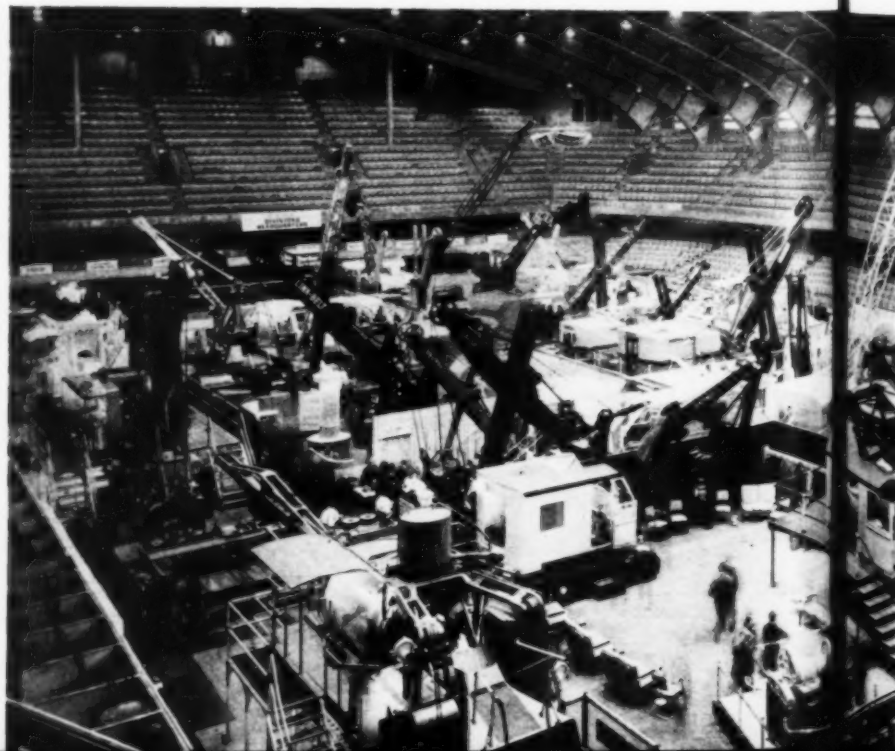


ALL IN THE FAMILY. LaPlant-Choate bulldozer on Caterpillar diesel tractor is operated by Miss Patricia La Plant Graves, daughter of company's vice-president and granddaughter of E. W. LaPlant, founder of organization that bears his name.

WORLD'S LARGEST EXCAVATOR (below), with heaped capacity of 45 cu.yd. and pneumatic tires nearly 9 ft. in diameter, was Le Tourneau carryall scraper, hauled by Tournapull two-wheel tractor powered by 185-hp. Caterpillar diesel engine.



WORLD'S LARGEST PORTABLE COMPRESSOR, with capacity of 900 cu.ft. of free air per minute, powered by 190-hp. diesel engine is feature of display by Chicago Pneumatic Tool Co.

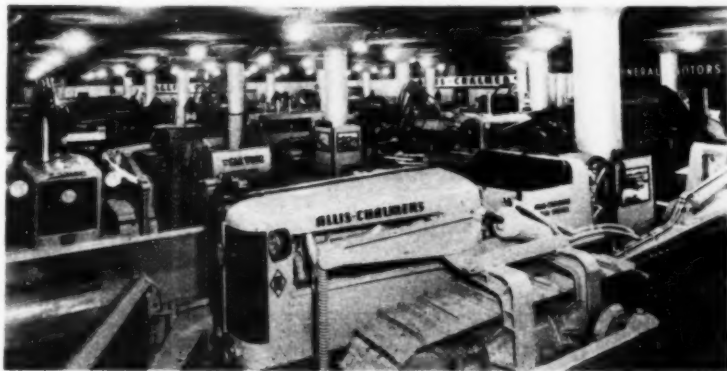


ROAD SHOW

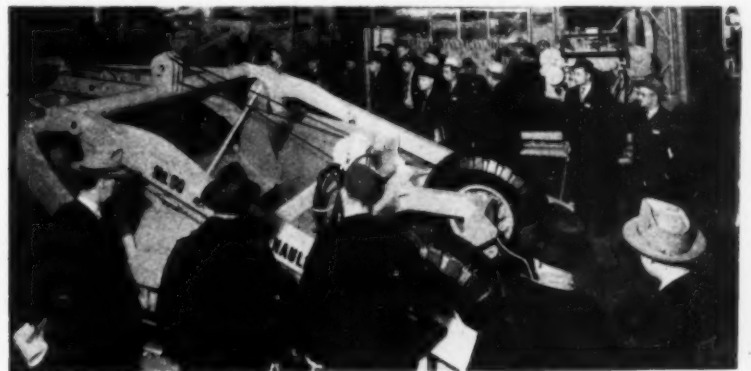
HEREWITH ARE PICTURED a few of the 250 exhibits of equipment and materials which occupied 8½ acres of floor space in Chicago's International Amphitheatre during the Road Show and 37th annual convention of the American Road Builders' Association, Jan. 29-Feb. 2. The event produced a record registration of 47,000 engineers, contractors, highway officials, equipment distributors and manufacturers' representatives.



ROAD OF TOMORROW, TO-DAY, is displayed by Gulf Oil Corp. in form of illuminated map showing location of 161-mi. Pennsylvania Turnpike



TRACTORS GALORE in a wide range of models and sizes, including new high-speed diesel unit rated at 7 m.p.h., were featured by Allis-Chalmers Mfg. Co. in one of Road Show's largest allocations of floor space. Also road graders, maintainers and power plants.



NEW HAULING SCRAPER with 5-yd. cable-controlled tilting bowl and four large tires for easy draft over soft material excites interest of spectators at J. D. Adams Co.'s exhibit

TWO-CYCLE DIESEL POWER PLANTS (right), in sizes from 15 to 150 hp. were featured by General Motors Sales Corp. and explained by animated Robophone used last year at company's New York World's Fair exhibit.

HEAVY EQUIPMENT (below), such as power shovels, cranes, dual-drum paving mixers, rock-crushing plants, bucket loaders, bituminous mixers and other machines was displayed in main hall of International Amphitheatre.



FOUR NEW DIESEL TRACTORS (below) featuring power-actuated steering clutches easy starting and other mechanical improvements, were attraction offered by International Harvester Co. Other engine units covered range from 20 to 100 hp.



CONSTRUCTION EQUIPMENT NEWS

(ALL RIGHTS RESERVED)

Review of Construction Machinery and Materials for APRIL 1940



**154%
AVERAGE
YEARLY SALES INCREASE
PROVES MONOTUBES'
GROWING ACCEPTANCE**

● Here's what engineers and contractors really think of the Monotube Method of Pile Construction. From 1935 through 1939, the sale of Monotubes has shown an average yearly increase of 154%!

Why this rapid acceptance?

One—economy of installation. These light, sturdy steel casings are easy to handle, require no core or mandrel, can be driven speedily by any competent contractor with standard equipment.

Two—economy in foundation design resulting from Monotubes' ability to carry greater loads with a high factor of safety.

Three—availability of Monotubes in varying gauges, tapers and lengths to meet a wide range of soil conditions.

Complete information on Monotubes is contained in our Catalog No. 68A. Write for your copy today.



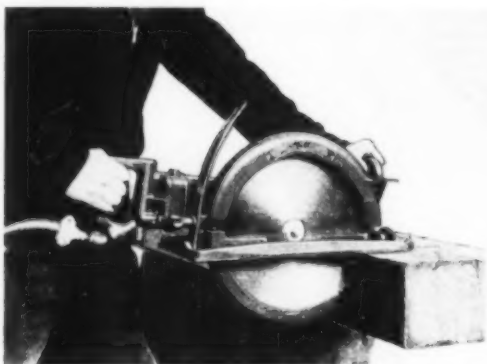
**THE UNION METAL
MANUFACTURING CO.
CANTON, OHIO**



CRAWLER SHOVEL. 1½- to 2-cu.yd. capacity, equipped with hydraulic (oil) power control and diesel, gasoline, oil or electric drive. Features: (1) Newly designed throughout, for greater strength, stability and efficiency without burden of extravagant weight; (2) Speed-O-Matic control said to increase output 25 per cent over manual control; (3) control of travel, steering and locking brakes entirely from operator's position in cab; automatic locking arrangement prevents involuntary movement of machine when it is out of gear; (4) increased ground clearance, 14½ to 18 in.; (5) travel, steering and locking machinery entirely inclosed; (6) choice of crawler widths and lengths to suit specific conditions; (7) unit-construction main frames, machine cut gears and anti-friction bearings; (8) easily convertible to dragline, crane or other front-end equipment.—Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.

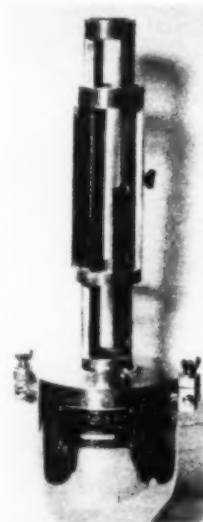
★ ★ ★

12-IN. PNEUMATIC CIRCULAR SAW develops 2.7 hp. at 1,400 r.p.m., has cutting capacity of 4¾ in. and air consumption at 90-lb. pressure of 70 cu.ft. per minute. Outstanding features: (1) adjustment for depth of cut; (2) swivel base for cutting angles up to 45 deg.; (3) blower operated by exhaust air of



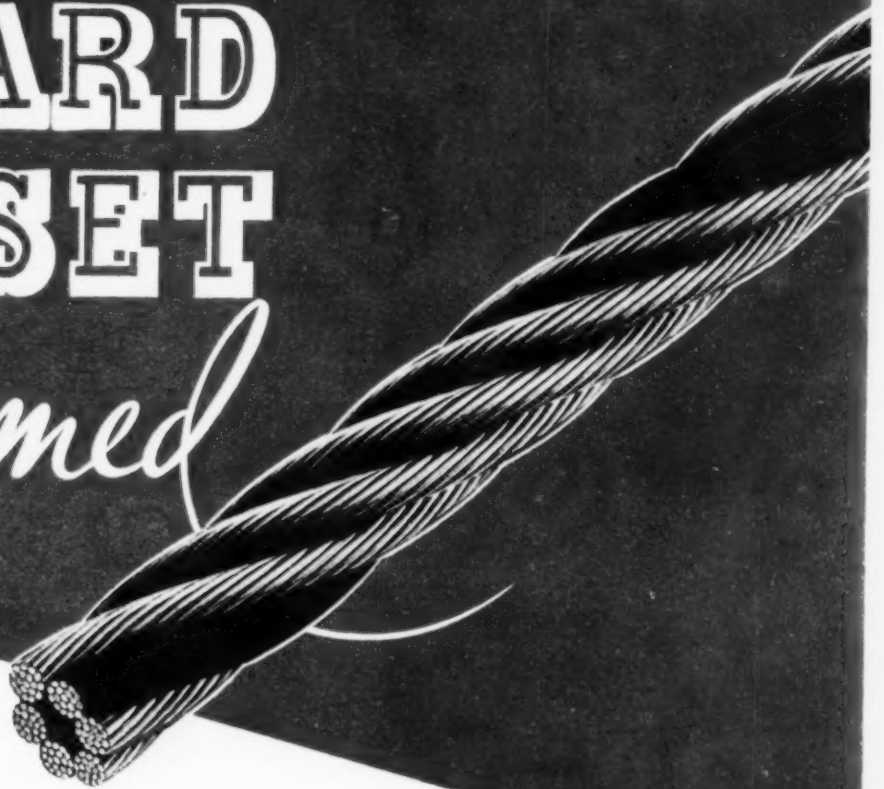
motor keeps cutting line and observation glass clear; (4) telescopic safety guard said to give complete protection to operator. Recommended to public park and forestry departments, to contractors doing tunnel work to public utility companies, public highway departments, municipalities and maintenance-of-way, bridge and building departments of railroads.—Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill.

MEASUREMENT OF MOISTURE IN CONCRETE AGGREGATES can be determined quickly and simply with aid of small portable aluminum flask, illustrated herewith, designed to give direct readings not only of moisture percentages, but also of bulk specific gravity of surface-dry sand, stone or gravel. In making moisture content tests 3½ lb. of material and 2.204 lb. (1,000 cu. cm.) of water are required. Index plates on flask are graduated for these quantities. For bulk specific gravity 3½ lb. of material are required in surface-dry condition. Aggregates and water are introduced into flask, and results are read at height water reaches in gage tube, specific gravity index marks being on one scale and those for moisture on another. With this method expense and delay of drying out aggregates is eliminated as water absorbed in material does not affect test. Flask, it is claimed, will keep water-cement ratio on concrete job consistent and will make possible check on bulking of sand.—Moisture Flask Company, Reg'd., 630 Quebec Ave., Outremont, Quebec, Canada.



HAZARD LAY-SET

Preformed



IS SAFER
LASTS LONGER
HANDLES EASIER
RESISTS KINKING
SPOOLS BETTER
RESISTS ROTATING
GIVES GREATER
DOLLAR VALUE



● The seven points at the left make a big statement, but every word is *true*. In fact, there are other important merits about Hazard LAY-SET Preformed that we haven't space to mention here.

Hazard LAY-SET is put through a scientifically calculated preforming process at the mill. This process eliminates the internal strain present in non-preformed rope. This relief from stresses makes LAY-SET a rope that is relaxed and willing to work. Every wire has amazing resistance to bending fatigue (and therefore lasts longer). Being flexible and limber, LAY-SET is easy to handle. Broken crown wires do not wicker out to jab workmen's hands. These are some of the other qualities which make Hazard LAY-SET Preformed the wire rope of greater dollar value, as operators now using LAY-SET Preformed will tell you.

HAZARD WIRE ROPE DIVISION • WILKES-BARRE, PA.

Established 1846

American Chain & Cable Company, Inc.

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Fort Worth, San Francisco, Denver, Los Angeles, Atlanta, Tacoma

LAY-SET *Preformed* **WIRE ROPE**

6 BIG REASONS

why you save Time and Money with BLACKHAWK Hydraulic Jacks

- 1 GREATER EFFICIENCY — Blackhawks Save Man Power**
 Deliver 94% operating efficiency, compared to 12% to 30% for mechanical jacks. Free extra men for other jobs. Greater adaptability, safer.



BLACKHAWK HYDRAULIC 94% EFFICIENT



MECHANICAL JACKS 12 to 30% EFFICIENT
- 2 EASIER OPERATION — One Man Easily Lifts Full Load**
 Smooth, giant hydraulic power does the lifting — every easy one-hand pump stroke, no matter how short, produces action.



50 TONS
BLACKHAWK HYDRAULIC METHOD



16 TONS
MECHANICAL METHOD
- 3 GREATER CONVENIENCE — Easily Carried and Set Up**
 Blackhawk hydraulic Jacks are compact — pack more power per pound than other types. One man can easily carry and position Blackhawk Jack.



EASILY CARRIED



EASILY POSITIONED
- 4 GREATER SAFETY — Positive Control of Load**
 Perfect control to thousandth of inch in raising or lowering. Blackhawk construction assures dependable holding power—no mechanical teeth to shear and suddenly drop load.



SAFETY SCREW-TYPE RELEASE VALVE


- 5 EXTRA UTILITY — Blackhawk Design Adapts Jack to More Jobs**
 Full power at any angle, vertical to horizontal — because pump is on the side. Handle extends outward toward operator (not toward floor) permitting horizontal operation at floor level.





BLACKHAWK HANDLE ALWAYS EXTENDED TOWARD OPERATOR
- 6 LONG, DEPENDABLE LIFE — Greater Return On Investment**
 Made by the world's largest manufacturer of hydraulic lifting equipment — proof of Blackhawk's ability to supply quality materials and manufacture at lowest possible price.



ONLY BLACKHAWK JACKS ARE TAGGED WITH THE SERVICE-PROVED SEAL

45 MODELS . . .

20 Regular Jacks — 1 to 75 tons
 13 Gauge-Equipped Jacks—7 to 75 tons
 12 Inverted Jacks — 7 to 50 tons

BLACKHAWK



MODEL EA-11
 — 20 TON JACK
 — Typical of large Blackhawk line. Note efficient, compact, rugged design. Weighs only 48½ lbs. User net only \$35.00. (Slightly higher in West and Canada.)

BLACKHAWK MANUFACTURING COMPANY
 Dept. J2340, Milwaukee, Wis.

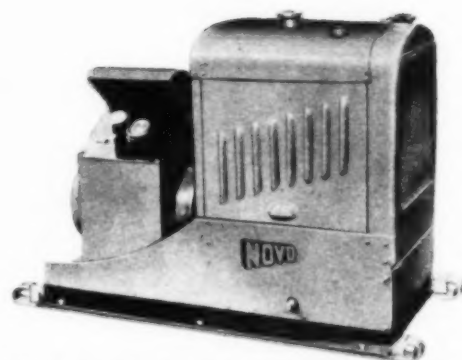
Send literature on the hydraulic equipment checked below:

- ☐ Hand Jacks ☐ Gauge-Equipped Jacks
☐ Porto-Power Remotely Controlled Jacks
☐ Pipe and Conduit Benders ☐ Wrenches

Name _____

Company _____

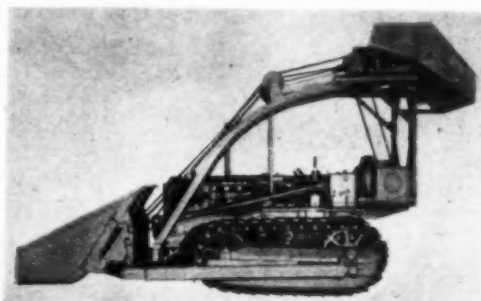
Address _____



GASOLINE OR DIESEL POWERED GENERATOR SETS built to meet demand for light for emergency work and also to supply power for electric portable tools on construction jobs. May be had in fifteen different sizes for d.c. and a.c. current. Feature close-coupled design, portability, and switch panels which have no open switches to burn out. — **Novo Engine Co., Lansing, Mich.**

★ ★ ★

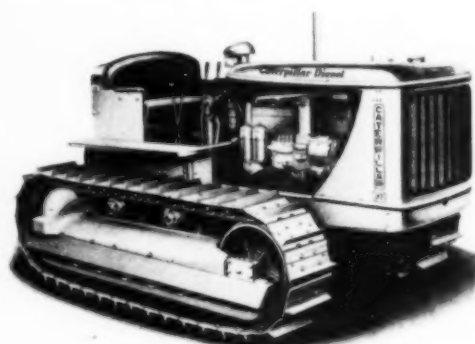
TRACTOR LOADER called Mobiloader is cable-operated ball-bearing mounted, worm gear transmission unit, designed for use of contractors; of state, county, city and township highway departments; in oil fields; in stockpile loading; in coal yards; for foundries, and for various industrial plant uses. Unit is attached to Caterpillar gasoline or diesel tractors without special mountings or boring any holes.

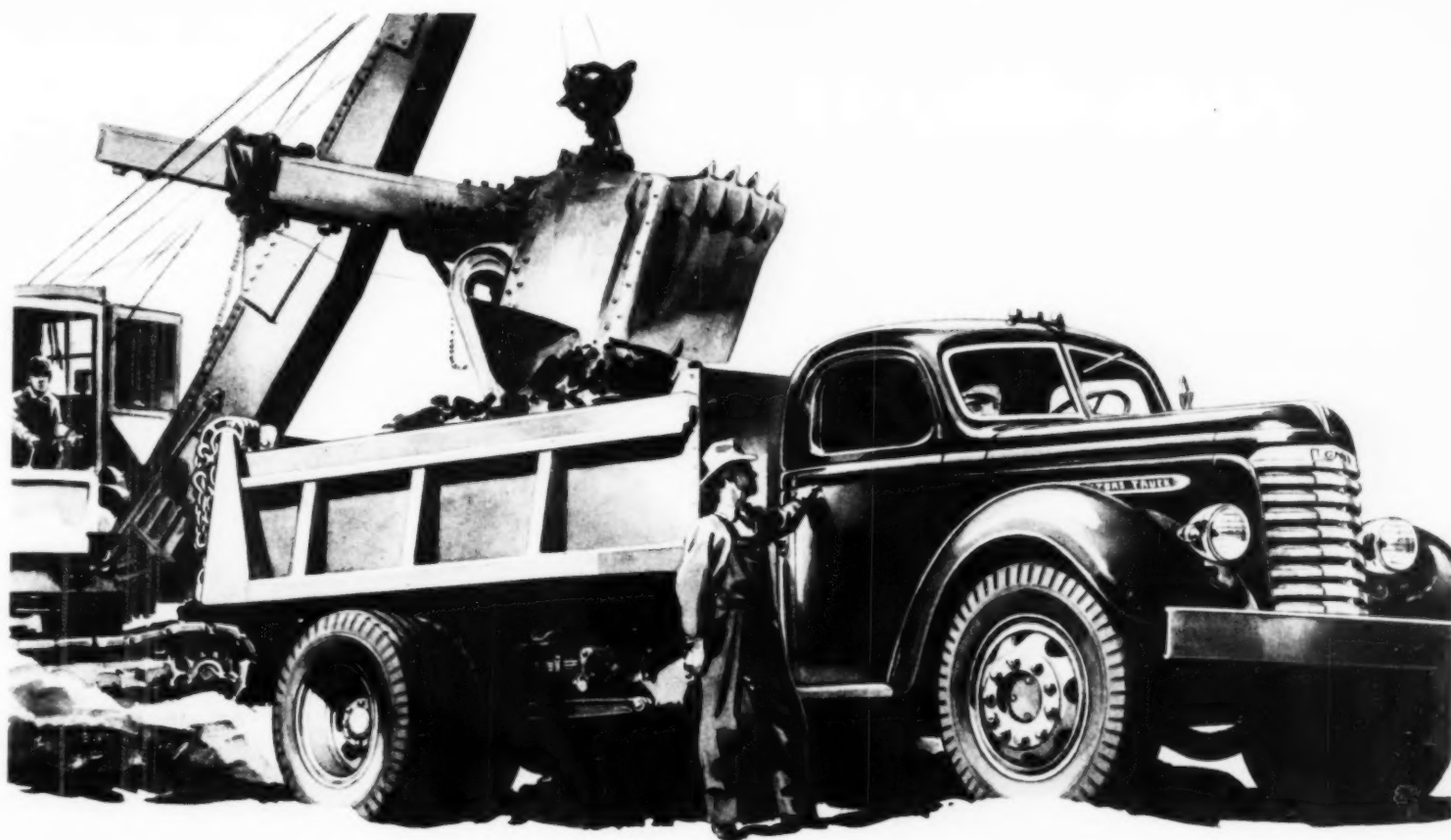


Equipped with 1½-yd. bucket. Clearance under chute for rear dumping, 7 ft. 6 in. For front dumping load can be discharged at any point from ground to 7 ft. 6-in. height. Control is from tractor seat—one lever controls all rear dumping and front dumping is obtained with simple adjustment. Manufacturer claims that tests show lifting and dumping cycle completed in 15 sec. Power transmitted from front power takeoff to reversing transmission and worm-gear unit mounted on left-hand fender. Tractor drawbar left clear to permit use of tractor for other purposes. Advantages: unobstructed view for operator and non-interference with tractor tracks which are free to operate normally. — **Athey Truss Wheel Co., 5631 W. 65th St., Chicago, Ill.**

★ ★ ★

DIESEL TRACTOR, 75-drawbar horsepower, incorporates numerous features designed to increase operator comfort and thus speed up production and also to assure longer life and lower upkeep for machine as a whole. For benefit of operators, fingertip steering is made possible, light pull of clutch lever being sufficient to steer 23,500-lb. machine. Only actual work done by operator is said to be opening of valve as steering clutches are hydraulically controlled. Streamlined hood and driver's seat located high and well forward on tractor give





NO OTHER TRUCK *PULLS* like a GMC!

POWER does it! And in GMC, you've got the *strongest pulling of all trucks*, $\frac{1}{2}$ to 15 tons. You've got the *greatest gas saver* in GMC's Super-Duty Engine with its revolutionary Power-Pak Pistons. You've got the *easiest handling truck* . . . Only GMC trucks give you Ball-Bearing Friction-Free Steering (in medium and heavy-duty models) that cuts steering effort as much as 57% . . . Only GMC offers Syncro-Mesh Transmissions (in heavy-duty models) that make gear-shifting as easy as in your car. Get behind the wheel in the roomy GMC Rider-Ease Cab and try out this "Truck of Value."

GMC ANNOUNCES

New 4 and 6 wheel Super-Heavy-Duty Models powered with the famous
2 CYCLE-GMC 6-CYLINDER DIESEL..

New 6-WHEELERS, FOR TOUGHEST HAULING JOBS
—dual drive and trailing types available

Our own YMAC Time Payment Plan assures you of lowest available rates



GMC TRUCKS

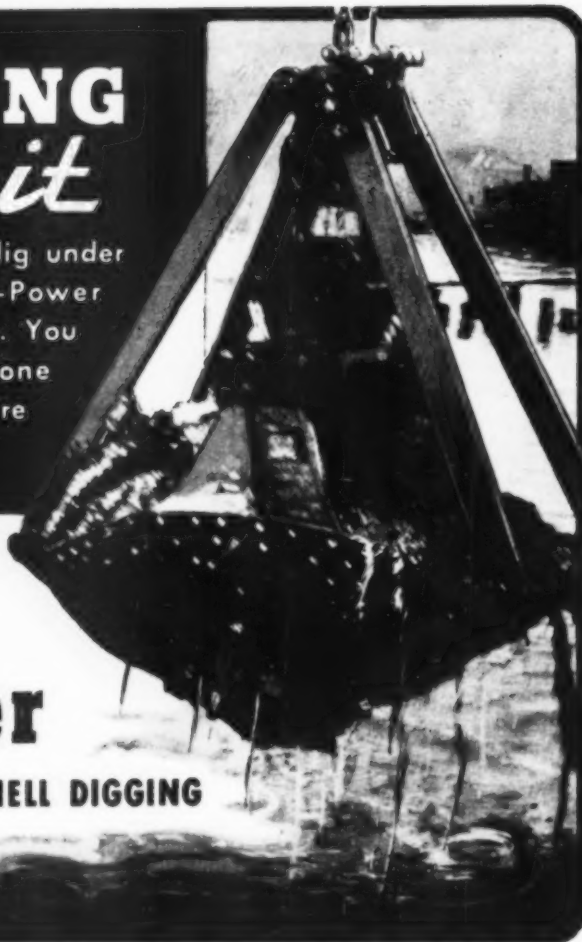
GASOLINE DIESEL

DREDGING *proves it*

Any clamshell that will dig under water as the Haiss Hi-Power does 's got what it takes. You can make money with one on ANY job. Write or wire for prices. All sizes.

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FOR PAY LOAD CLAMSHELL DIGGING



In stock at New York, Philadelphia, Baltimore, Birmingham, Atlanta, Hartford and Los Angeles
GEORGE HAISS MFG. CO., INC., 139th ST. & CANAL PLACE, NEW YORK—DISTRIBUTORS EVERYWHERE



"After all these years, I've been converted—
your wellpoint equipment is 'Tops'!"

writes a contractor who has probably tried every method of dewatering wet jobs. Benefit by his experience—for dry digging at a low cost predrain your work with a MORETRENCH WELL-POINT SYSTEM. Results are guaranteed.

MORETRENCH CORPORATION

90 WEST STREET, NEW YORK

Plant: Rockaway, New Jersey

Warehouse: Joliet, Illinois

clear view of work from all angles, eliminating neck stretching and leaning. Cab is equipped with restful and durable wide seat and also small seats on both left- and right-hand arms of main seat to provide comfortable place from which driver can operate rear power-controlled equipment. Other features: (1) welded steel construction; (2) heavy-duty, 4-cylinder, valve-in-head diesel engine with 5 $\frac{3}{4}$ x8-in. bore and stroke, governed full load of 1,000 r.p.m., belt horsepower, 87; (3) either of two 5-speed transmissions: low-speed provides five forward speeds ranging from 1.4 to 5 m.p.h.; high-speed from 1.4 to 6 m.p.h. Each of first four forward speeds has slightly higher reverse obtained by shifting lever which works independently of change speed shifting lever. — Caterpillar Tractor Co., Peoria, Ill.

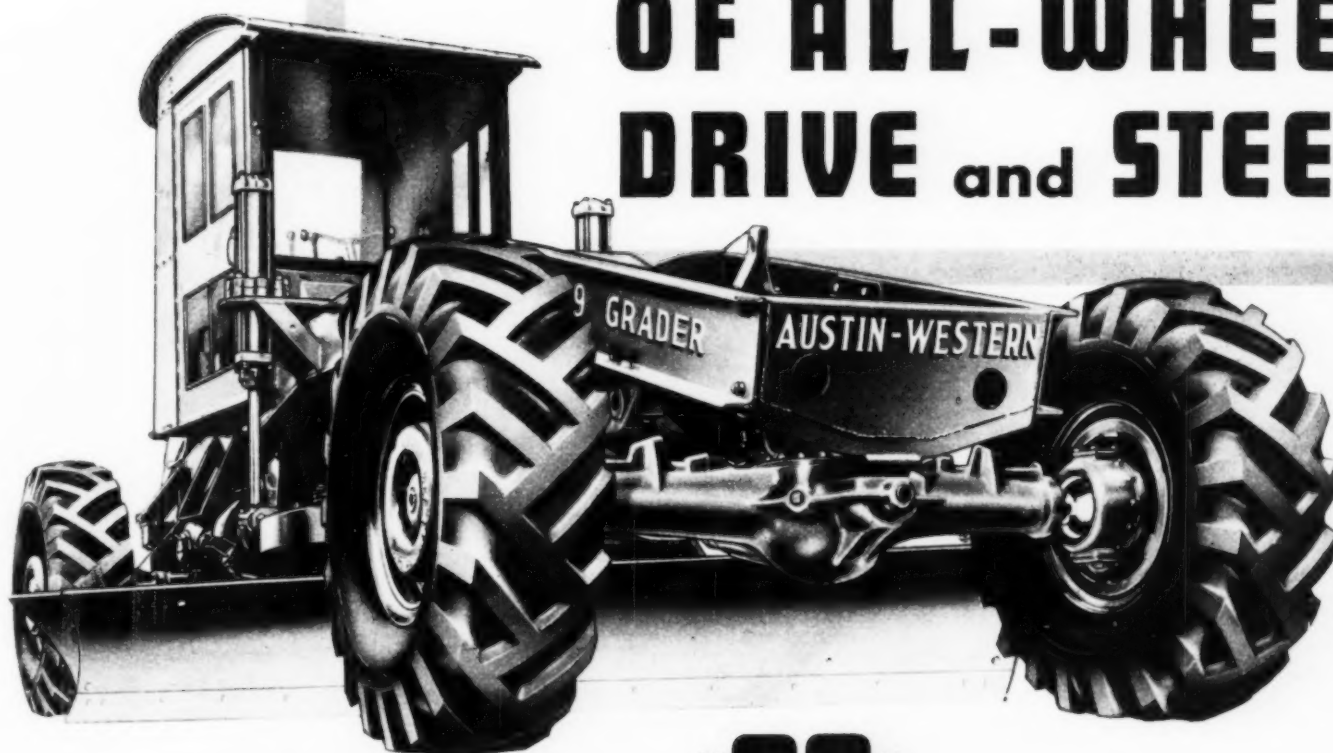
★ ★ ★

THREE NEW VIBRATORS have been added to Chicago Pneumatic line of pneumatic and electric models for reinforced and mass concrete placement. Pneumatic vibrator at left and electric vibrator in center are for batches up to 2 cu.yd.; for placing concrete in dams, medium bridge piers, mats and locks; for use as auxiliary vibrator in compacting concrete around reinforcing steel, along forms and hard-to-get-at places. Features: (1) Specially designed for rugged work; (2) high frequency with direct drive—no flexible shafts; no reduction gears;

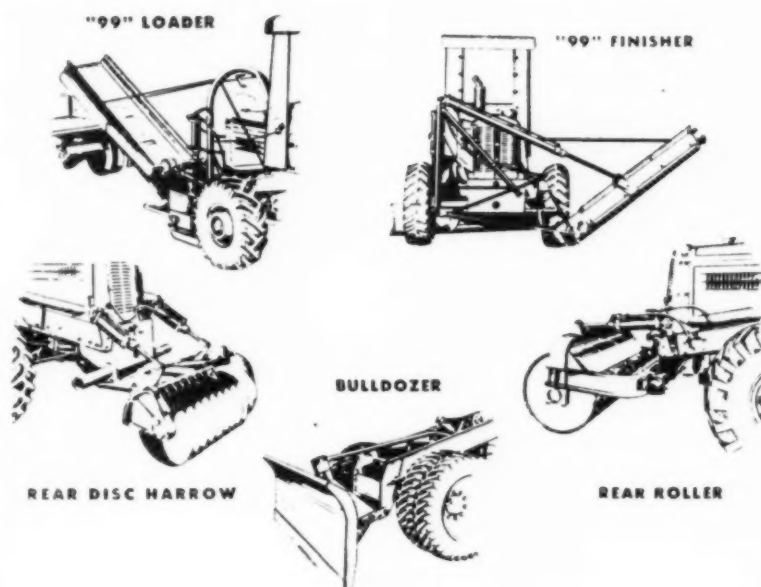


(3) pneumatic and electric motors interchangeable; (4) all handles mounted on rubber to eliminate vibration and shock; (5) properly balanced for ease of operation; (6) frequency changes for electric models available in all sizes. Frequency, v.p.m. 7,000; capacity, cubic yards per hour, 25-35; length, overall, 3 ft. 10 in.; length vibrator tube, 17 in.; diameter, 4 $\frac{1}{4}$ in. Air consumption, pneumatic model, c.f.m. at 90 lb. under 55; Watts input at 110-v., 120 cycle, 2,500. Electric model at right used for placing concrete (1) around transverse and longitudinal joints of highway pavements; (2) on deck slabs of bridges; (3) for floor and roof slabs of buildings; (4) for precast piles and slabs; (5) for light foundations such as bridge piers and abutments where operator can get into forms. Features: (1) Universal motor operates on either 110-v. a.c. or d. c. current; (2) dust proof motor and switch; (3) lightweight and easy to manipulate; (4) no flexible shaft; no reduction gears; (5) high frequency; (6) vibrationless handles mounted on rubber; (7) available with or without power unit. Frequency, v.p.m. 9,000; weight, 35 lb.; length overall, 35 in.; length vibrator tube, 19 in.; diameter, 2 $\frac{1}{2}$ in.; 8.5 amp. a.c. or d.c.; 110-220v., as specified.—Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

TEAMWORK OF ALL-WHEEL DRIVE and STEER



...GIVES THE "99"
THESE EXTRA USES



● There's no compromise with quality of work or economy of performance when the A-W "99" Power Grader is used for Loading, Finishing, Scarifying, Discing, Rolling or Bulldozing. Due to All-Wheel Drive and Steer, a "99" has the power, traction and maneuverability to handle such jobs with the efficiency heretofore obtainable only from a specialized machine. And, remember, all of these jobs are *plus values*! The "99" is a real "buy" on its superior ability in handling heavy ditching, rough grading, maintaining and other specific power grader jobs. It operates closer to culverts, bridges and other obstructions. It cuts down banks faster. It moves larger windrows farther. It plows deeper. It keeps going regardless of weather or soil conditions. Try out a "99" at the first opportunity. Its power and practical versatility will convince you that your next power grader **MUST** have All-Wheel Drive and Steer. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

Motor Graders • Blade Graders • Crushing and Screening Plants
Elevating Graders • Rollers
Hydraulic Scrapers • Roll-A-Planes
Cable Scrapers • Motor Sweepers • Bituminous Distributors

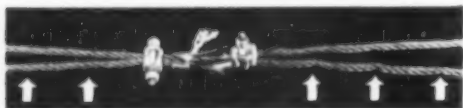
Austin-Western



NO CRIMPING "FINGER PINCH" THAT SPOILS WIRE ROPE

When a Laughlin drop forged Safety Clip takes hold of wire rope, it means business. The solid fist-like grip is 50% more efficient than ordinary U-Bolt Clips, as proved by recent tests at a famous engineering school.

You also save the rope that would ordinarily be cut off after being crimped by the "finger pinch" action of U-Bolt Clips. Laughlin Safety Clips, when removed, leave the rope straight, uncrimped, ready to use again.



FEWER CLIPS NEEDED. Where you've been using four ordinary U-Bolt Clips, you will need only three Laughlin Safety Clips to get the same strength.

FASTER TO APPLY. Laughlin Safety Clips have nuts on opposite sides — easy to get at — you can use two wrenches at once. That saves time — and many a cuss-word.



Write for the free booklet giving results of tests made by a famous engineering school. Take the first step to saving some real money by mailing the coupon now.

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Wisconsin engine, driving through two speed transmission and floating plate clutch. Final drive is through steel cut sprockets and roller chain to large roller, providing speeds of 1 1/4 and 2 1/2 m.p.h. Roller is moved from job to job on pneumatic-tired roller bearing wheels which are lowered by self-locking jack screws, actuated by crank at front of machine. Trailing tongue, carried in loops on side of roller then is inserted and roller is ready to travel behind light truck at rate of 50 m.p.h. Roller can be maneuvered in close quarters or turned in small radius, said to make it particularly suitable for state highway or city maintenance operations. Five gallons of gasoline said to be sufficient for 10-hr. operations. Both rollers provided with self-adjusting scrapers and cocoa mats kept wet from tank in hood of roller, thus preventing material from clinging to rolls.—Shovel Supply Co., 1300 McKinney Ave., Dallas, Tex.

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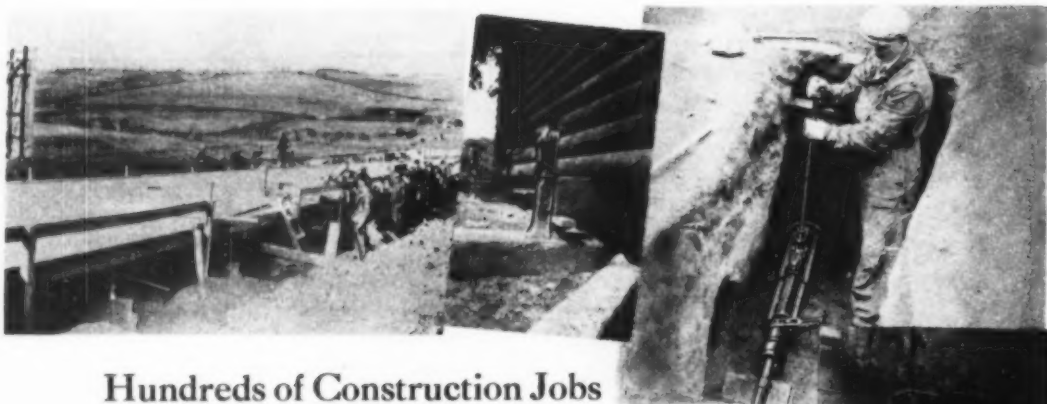


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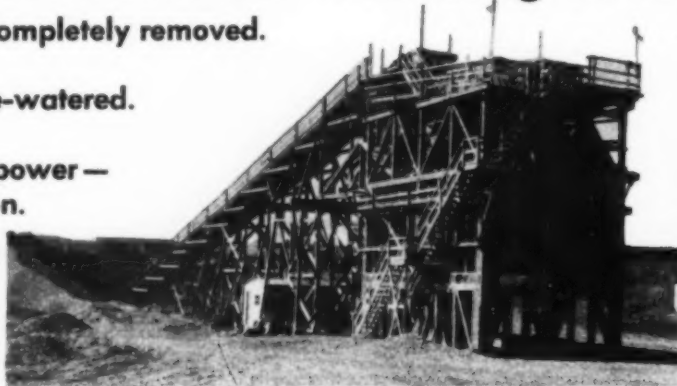
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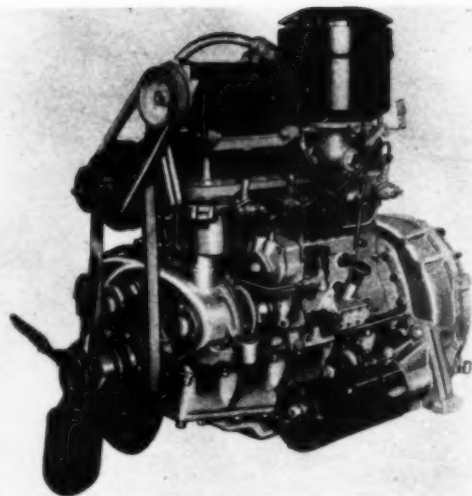


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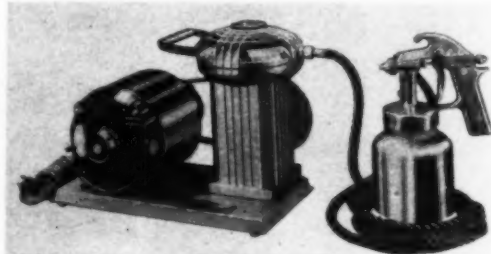
Reliance offers a complete line of Rock Crushers; Bucket Elevators; Revolving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettles; Bin Gates; Feeders; Belt Conveyors; Grizzlies; Air Separators; Sand and Gravel Spreaders; Wash Boxes.



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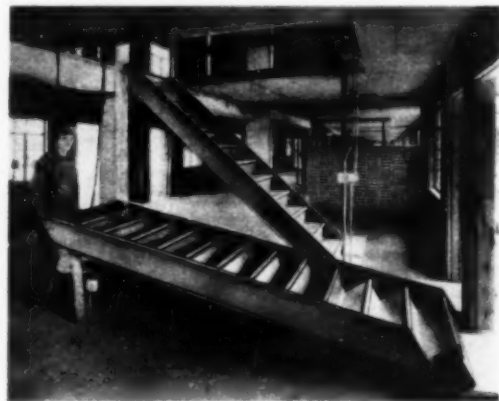
SPRAY-PAINTING OUTFITS for spraying viscosity paints, enamel, lacquer, calcimine, varnish and insecticides, may be had in two models. (1) With single diaphragm compressor capable of producing 2.2 c.f.m. of air at 26-lb. working pressure and Roche "J" internal atomization, bleeder type adjustable spray gun and quart pressure cup. Compressor pulsation chamber one piece with head. Special



composition rubber diaphragm. Sealed pre-lubricated crankcase. Gun equipped with flat spray nozzle and with moisture filter, easy to drain. Outfit includes 12 ft. of 1/4-in. braided hose and connections, two V-pulleys with V-belt and carrying handle. (2) With piston-type compressor of same capacity as above and for use with same type of spray gun. Mounted on steel base with vibration-absorbing rubber feet.—Binks Mfg. Co., 3114-40 Carroll Ave., Chicago, Ill.

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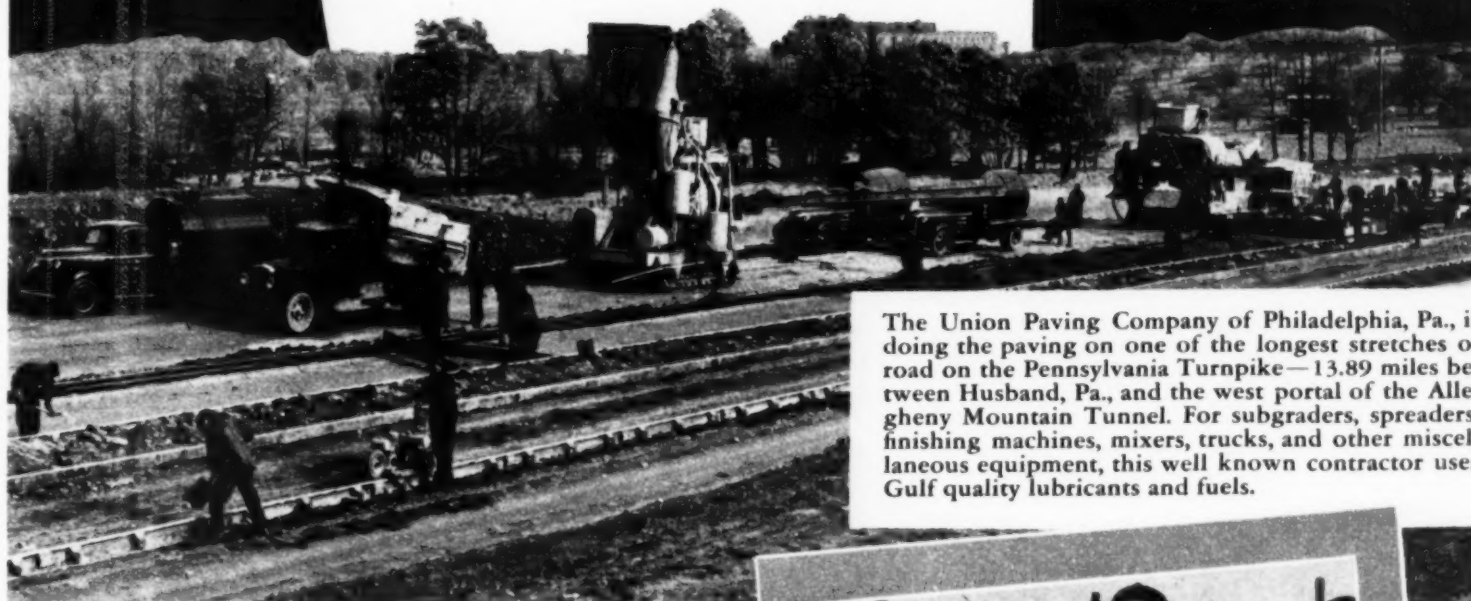
10-IN. HOT ROLLED STEEL CHANNEL SECTION weighing 6 1/2 lb. to foot has been designed to meet demand for rigid steel stairs in residences, apartments, housing projects and other light occupancy buildings. Makers recommend this lightweight chan-



nel to ornamental metal manufacturers as product of true shape and accurate dimension of known structural quality steel and claim that it is stronger than cold formed steel channel of equal weight. Said to meet demands for safety and comfort, to give protection of sound structural steel to stair treads and to lend itself readily to ornamental trim.—Jones & Laughlin Steel Corp., Pittsburgh, Pa.

... "we're making good time on this
fast work schedule with

GULF QUALITY LUBRICANTS AND FUELS" says Superintendent on big
TURNPIKE PAVING JOB



The Union Paving Company of Philadelphia, Pa., is doing the paving on one of the longest stretches of road on the Pennsylvania Turnpike—13.89 miles between Husband, Pa., and the west portal of the Allegheny Mountain Tunnel. For subgraders, spreaders, finishing machines, mixers, trucks, and other miscellaneous equipment, this well known contractor uses Gulf quality lubricants and fuels.

"All our equipment has performed at top-notch efficiency and our maintenance costs have been very low."

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Here's one important reason why so many contractors on the Pennsylvania Turnpike standardized on Gulf products: *they have found that Gulf lubricants and fuels are always the same uniform quality and that Gulf service is dependable.* No matter where your job is located, you are sure of a reliable source of supply for quality lubricants and fuels when you get in touch with the Gulf representative in your vicinity.

Call in the Gulf engineer *now* and ask him to recommend efficient lubrication practice for all your equipment. He can help you finish your job with a bigger profit.



Two spreaders of this type are used on this job. The operator says: "Gulfpride Oil and Good Gulf Gasoline are helping us make a fine record for efficient and economical service from this unit."



For subgraders like this, Gulfpride Oil is used for motor lubrication and Gulf High Pressure Grease for all pressure fittings. Operators report low consumption and complete freedom from operating troubles.



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Just as nature endowed the elephant with amazing strength, so have designing and scientific methods embodied unusual strength in the ABW Solid Shank Shovel.

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- 1—The Patented ABW Shock Band, which adds substantially to the handle strength.
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Add to these features the quality of the steel, the heat treating process, and the Second Growth Northern Ash Handle and it is easily understood why the ABW Solid Shank Shovel is the strongest shovel made. The D Handle Shovel is equipped with the famous ABW Armor-D Handle—the most perfect handle made.

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HEAVY-DUTY, CAB-OVER-ENGINE TRUCKS with capacity ratings of from 12,300 to 18,900 lb. and with wheelbases of 94, 106, 124 and 142 in., are designed to help solve increasingly difficult parking problems and to move faster to and from loading docks and crowded places where deliveries must be made. Additional features: Replaceable cylinder engines, clutches, transmissions, rear axles and brakes. Powered by valve-in-head, 6-cylinder engines. Oil-bath type air cleaners remove dust and gritty particles assuring transmission of clean air only to carburetor. Lubrication of engines is by full pressure through de luxe-type oil filter to all work-



ing parts including main and connecting rod bearings, cam-shafts, piston pins and rocker arms. Insulated, fully lined, all-steel cab. Steering wheel, clutch and brake pedals, crankshaft and other controls conveniently located. — **International Harvester Co., 180 N. Michigan Ave., Chicago, Ill.**

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CONCRETE BUSTER TOOLS guaranteed against breakage until they are re-forged are made of premium round steel under controlled forging and heat-treating conditions and ground to eliminate



surface defects. Said to be harder, more shock resisting, to wear longer and to do more work. Supplied both in conventional and Arrowpoint types. — **Sullivan Machinery Co., Woodland Ave., Michigan City, Ind.**

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PORTABLE ELECTRIC NIBBLER for cutting all kinds of sheet metal is compact tool 9 in. long and weighing 3 3/4 lb. with yoke-type front head incorporating a punch and die that "nibbles" out a rectangular shaving of metal at each upward stroke of punch. Will cut up to No. 18 gage (.049 in.) in steel and up to No. 15 gage (.072 in.) in aluminum. Because it cuts its own clearance, nibbler said to cut wide strips without distorting or curling sheet even if it is



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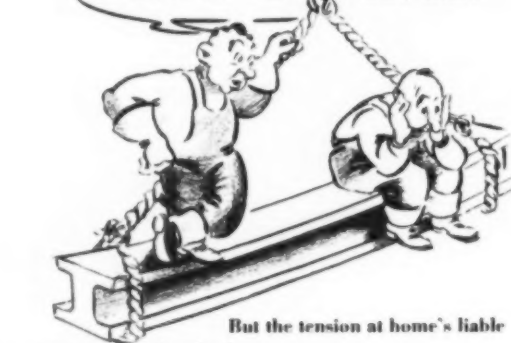
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curved or corrugated. Internal cuts, curves, circles as small as 2 in. in diameter and 1 1/2-in.-diameter shapes from tubing may be made. Motor housing, 2 1/2-in.-diameter, serves as tool handle. Cutting punch recessed to prevent overloading or stalling when feeding and also to assure safety of operator. Head can be loosened, turned to right or left and set at 30- to 90-deg. angle when space is limited.—Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.

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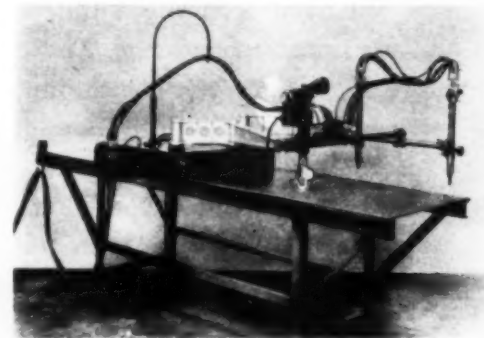
ELECTRIC GLUE POT, automatic, dry-type model, features snap action thermostat which maintains temperature of between 150 and 160 deg. F., said to be most efficient temperature for keeping glue at working consistency. Time required for heating full 2-qt. container to 150 deg. F. is from 30 to 50



min., according to type of glue used. Removable nickel plated copper glue container 7 3/8 in. in diameter and 9 in. high will hold heat and yet withstand hard service under constant use. Units have rating of 250 watts and operate either at 115 or 230 v. Heavy insulation between inner and outer vessels prevents heat loss and said to increase efficiency. Mica insulation protects nickel chromium heating element from outer wall. Each unit furnished with 8 ft. of heavy rubber insulated cord.—Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

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GAS CUTTER, named No. 10 Planograph, is said to cut straight lines, rectangles, circles and irregular shapes from ferrous metal of any thickness within practical limits of cutting torch. Consists of tracing table upon which travels carriage supporting torches and tracing devices. Operates either on 110 or 220 v., a.c. or d.c. Cutting range in single operation, 24 in. wide by 72 in. long. Length can be increased in multiples of 72 in. by utilizing additional tracing tables. Maximum diameter of circle cuts, 24 in. Tracing device may be locked so that it will travel in straight line in any desired direction without manual guidance. Devices for magnetic and templet tracing can be quickly interchanged in existing head. Speed of motor governed by graduated disk known as Index Speed Control, providing



complete range of motor speeds in one full turn at 360 deg. Cutting speed in inches per minute registered on reversible tachometer. Gas control unit centrally located. Knob handle operates cams, progressively arranged, one each for pilot light, acetylene (or other fuel gas), oxygen preheat and cutting oxygen.—Air Reduction Sales Co., 60 E. 42nd St., New York City.

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1,534; total, 1,534 ft. advance made in any one month was 61 ft. Four rounds have been drilled, blasted, and loaded in one 8-hour period; the average, however, is between three and four. Average time spent in drilling in an 8-hour shift is 4 hours and 20 minutes, which includes moving in the jumbo, drilling, removing the jumbo, and blasting. The time required for the individual operations is as follows: moving in the jumbo and setting up, 10 minutes; drilling a round, 50 minutes; removing jumbo, 5 minutes; loading and blasting, 15 minutes; total 80 minutes. The average time spent in mucking during an 8-hour shift is 3 hours and 40 minutes, which includes moving in loader, loading, and removing loader. Moving in the loader requires 10 minutes, mucking a round 50 minutes, and removing the loader 5 minutes—a total of 65 minutes.

An Eimco 21 loader is used, mucking into Granby-type cars of 84 cu.ft. capacity. The cars are shifted behind

Reproduced from 3-page article entitled "Deeper Drainage for Cripple Creek District" in Dec. 1939 issue of Engineering & Mining Journal. We'll be glad to send you a reprint of the complete article.



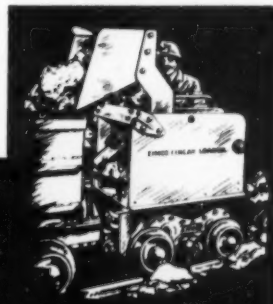
1534 ft. advance in October 1939 exceeded all previous records for a single-heading tunnel!

FIFTY MINUTES to muck out a 5½ ft. round in a 9½' x 9½' tunnel—3 to 4 complete rounds drilled, blasted and loaded out in an average 8-hr. shift—61 ft. advance in 24 hours on three different days—more than 8000 ft. total advance during the past six months—that's SPEED, and these are actual performance figures from the 32,000 ft. tunnel now being driven by the Golden Cycle Corp. to dewater a group of mines near Cripple Creek, Colorado.

Only one Eimco-Finlay Loader is used at a time, as shown in the illustration above, and the 87 cu. ft. cars are filled in less than three minutes. Air consumption is about the same as for a "drifter" drilling machine, the

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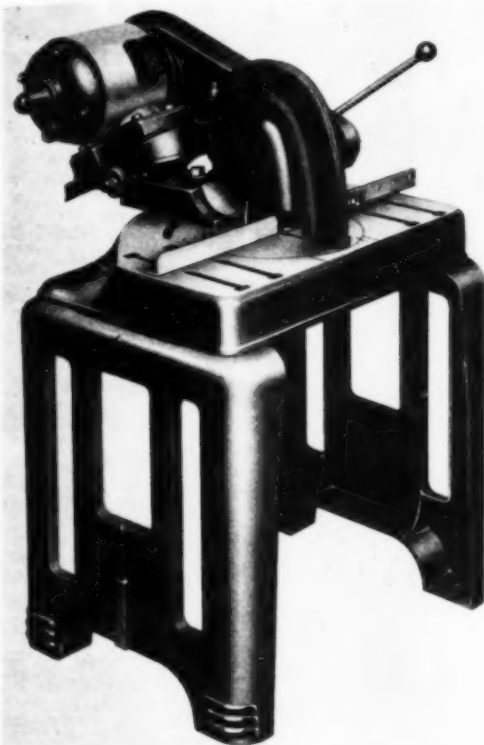
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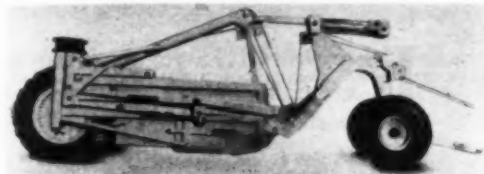
IMPROVED ABRASIVE CUT-OFF MACHINE for cutting to exact lengths such material as steel, brass, copper, cast-iron, monel metal, bakelite and all such plastic materials, pipe, wire rope, stellite, tool and manganese steel, fibrous material, such as brake linings, tile, brick, carbon, porcelain, slate, hard rubber, concrete coping and sand cores. Capacity up to 2-in. diameter, or material up to 2x6 in. Machine



said to leave polished surface on metal, thus eliminating necessary burring and finishing operations. By substituting saw blade, unit may be used for cutting wood. Outstanding features: (1) Wide-spaced Timken roller pivot bearings and double arbor sealed-for-life bearings requiring no lubrication; (2) Tex-Rope V-belt drive—adjustable fence—accurately machined table. Said to be perfectly balanced, to cut material at any angle and to embody unusual safety features, such as husky chip guard, belt and wheel guards.—Delta Mfg. Co., Milwaukee, Wis.

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DOUBLE BUCKET, CABLE-CONTROLLED CARRY-ALL SCRAPER, 14 cu.yd. struck and 18 cu.yd. heaped capacities, is designed to handle more "pay dirt" per pound drawbar pull and to give maximum capacity for loading under normal conditions without aid of pusher, thus completely utilizing tractor power. In order to minimize loading effort and make greater yardage possible, scraper blade is narrowed to 8 ft. 6 in. and patented double-bucket bowl is used. Narrow cutting edge and two telescoping buckets said to give effect of loading suc-



cessively two small scrapers with large tractor, assuring capacity loads and extra yardages. After first bucket is loaded to capacity, it is drawn back while second is being loaded. Double bucket loading method intended to eliminate costly voids in rear of bowl and at top of tailgate. Other advantages claimed: (1) Sheaves for pulling tailgate forward in unloading are placed in vertical position on sides where they keep cable out of dirt and give center pull to tailgate, reducing rail, roller, cable and tractor wear and strain; (2) narrow blade permits 10 ft. 1-in. overall width eliminating transportation problems; (3) single adjustment for two bucket catches with greater leverage synchronizes two catches and prevents tailgate and buckets from jamming; (4) new type yoke gives greater strength and additional clearance for sharp turning of front wheels; (5) higher sides reinforced by five channels prevent loss of pay dirt by side spill. Optional tire equipment: either 4(18.00x24), 6(13.50x20) or 2(18.00x-24) and 2(18.00x40).—R. G. LeTourneau, Inc., Peoria, Ill.

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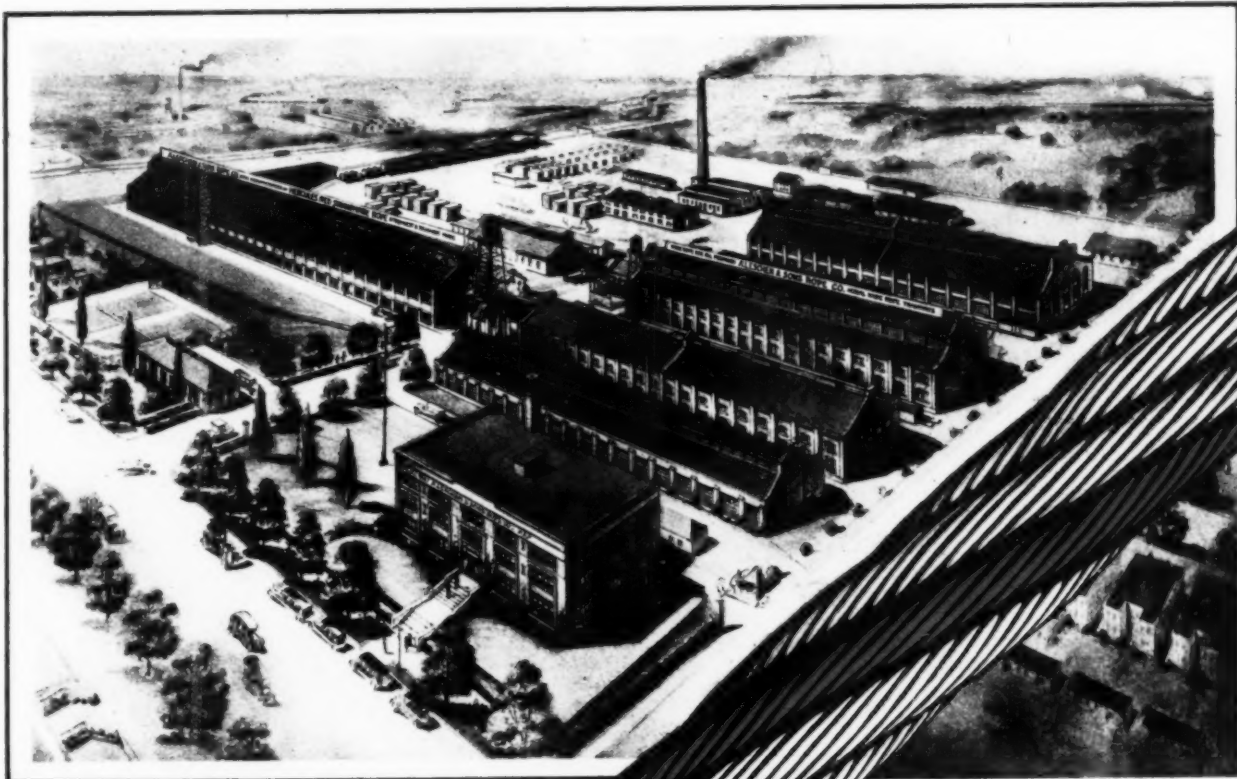
Today's high speed construction schedules demand equipment that is dependable and adequate—and on both points Duff-Norton Jacks are "tops"! With more than 300 styles and sizes of Duff-Norton Jacks to choose from, you can select the types and capacities best suited for your particular needs. The Duff-Norton line is adequate.

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The answer is yes, if it is a Rex Speed Prime Pump: No, if it is any other. For only the Rex Speed Prime Pumps bring you the advantages of this ingenious little Z-Metal blade placed directly above the impeller. It literally peels the air from the pump when it is priming or when the suction line is leaking air. That's why your Rex Speed Prime Pump will prime up to 50% faster, will hold its prime longer, will give the kind of pumping performance you want on all your jobs.

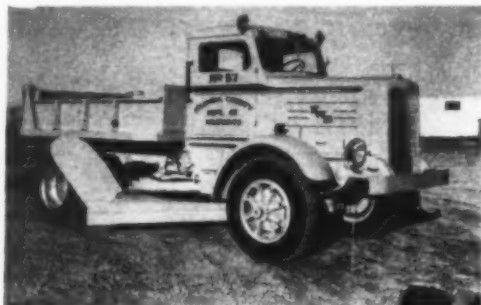
FREE! NEW REX CATALOG

"1940's Outstanding Pump" is the title of the new Rex Speed Prime Pump catalog which gives complete and detailed information about the famous Rex Peeler, the Rex Z-Metal impeller, the Rex Automatic Recirculation Cut-off and many other exclusive Rex features. Whether you want a pump that will move from 7,000 to 125,000 gallons per hour, send for your copy today!

CHAIN BELT COMPANY
Dept. P-4, 1664 W. Bruce St., Milwaukee, Wis.

REX SPEED PRIME
PUMPS

CENTER BLADE SCRAPER SNOW PLOW, for reducing winter traffic accidents caused by packed snow and ice ruts, is said to be built on entirely new principle: entire unit is carried on sprung weight—none of weight or shock from plow is taken directly by driving axles. This is claimed to increase speed, to permit blade to do more efficient work, to protect driving mechanism of truck against excessive road shock, and to prevent damage to scraper blade from impact shock. Positive automatic tripping feature permits blade to slide over solid obstructions such as pavement slab projections, man-hole covers and street car tracks. Cutting pressure,



maintained by two hydraulic rams, one on each side of truck frame, is transferred to scraper blade through sturdy toggle arrangement operating against coil spring in connection with toggle and push frame of plow. With hydraulic ram operating at maximum angularity and when coil spring is at 80 per cent of full compression, should blade strike an obstruction not cleared by tripping action of kick springs on blade, push frame may rise to avoid road shock and at same time force plow to follow irregularities of pavement. By manipulation of bi-valves controlling hydraulic rams, blade may be regulated to exert equal or unequal pressure on all sections of road according to will of driver. Extra high road clearance said to be provided even when blade is raised after operating at maximum angularity. Mechanism of plow arranged so that control valves may be located under skirting of truck, and none of operating mechanism of blade protrudes above top of frame.—The Four Wheel Drive Auto Co., Clintonville, Wis.

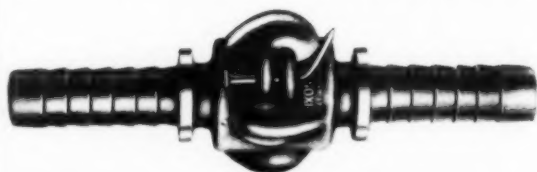
★ ★ ★

FACE-SHIELDS, intended for use on jobs where goggles are not absolutely required, but where protection of face from hot sparks, chemical splashes, flying grit and dust is necessary. Available in three models: without sparkshield, with semi-sparkshield and with full sparkshield. Feature: Preformed head-



gear which conforms to natural contours of back of head and center top strap which supports shield without pressure on sides; three-way, full headgear adjustment; finger control of friction adjustment permitting easy visor movement; aluminum binding around entire visor edge to increase durability. Plastic visor, either green or clear, in 4-, 6- and 8-in. sizes may be pushed upward and back on top of head, as desired. Headgear of high quality, moisture resistant fiber; sweatbands, genuine leather.—Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.

They BOTH Save Time and Trouble!



"AIR KING" Quick-Acting, Universal Type HOSE COUPLING

The "AIR KING" Coupling will save time, trouble and expense on every job that requires frequent coupling and uncoupling of hose to maintain service. A push, a quarter-turn, and the connection is made. Then, to make it absolutely safe, the heads can be quickly and securely held together by inserting cotter pin, nail, or piece of wire through holes provided for this purpose. The locking ends (heads) are identical for all sizes of hose and threaded ends, permitting the coupling of any two sizes of hose within the hose end range of this coupling; or coupling to any pipe up to 1" by use of threaded connections.

Every detail of "AIR KING" design and construction insures the utmost in efficiency, durability and economy. Each coupling is tested on a "go and no go" gauge to make absolutely certain it is interchangeable.

The "AIR KING" male and female interchangeable I.P.T. ends are illustrated above.



Threaded I.P.T.
Female End



Threaded I.P.T.
Male End

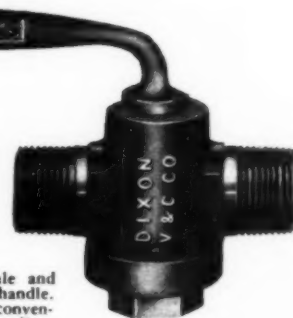
"BOSS"

SELF-HONING AIR VALVES

Cadmium Plated — Rustproof

Made with a drop-forged steel handle attached to the bronze plug within the valve body, a safety and efficiency feature formerly found only on premium-priced "BOSS SUPER" Valves. This new patented method of combining handle and plug within the valve body eliminates all chance of handle coming off.

SELF-HONING!
SELF-ADJUSTING!
QUICK-OPENING!
NO PACKING!
NON-STICKING!



Sizes: 3/4" & 1", both Male and Female, furnished with new handle. 1/2" and 2" furnished with conventional externally attached handle.

Stocked by Leading Rubber Manufacturers and Jobbers.
Write for Descriptive Folder.

DIXON
VALVE & COUPLING CO.

MAIN OFFICE AND FACTORY: PHILADELPHIA, PA.
BRANCHES: CHICAGO • BIRMINGHAM • LOS ANGELES • HOUSTON



IT'S EARTH-MOVING IN A BIG WAY WITH

LIMA
on the
Pennsylvania
Turnpike

Owners report that LIMA shovels are hitting new high marks for big yardage at low cost along the 161 mile Pennsylvania Turnpike. At times the digging consists of rock that ordinarily would have to be shot-up before a shovel could handle it, but LIMA'S are taking it without coaxing. Maximum power backed by sturdy construction and dependable service are qualities you get in every LIMA regardless of size. Hook up with a LIMA, the excavator that does things in a big way.

Write for a Free Bulletin Today.

ABOVE ILLUSTRATION SHOWS LIMA 1 3/4 YARD SHOVEL OWNED BY B. H. SWANEY, MOUNT LEBANON, PENNSYLVANIA.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division
LIMA, OHIO
NEW YORK CITY NEWARK DALLAS MEMPHIS SAN FRANCISCO LOS ANGELES SEATTLE PHILADELPHIA MONTREAL VANCOUVER

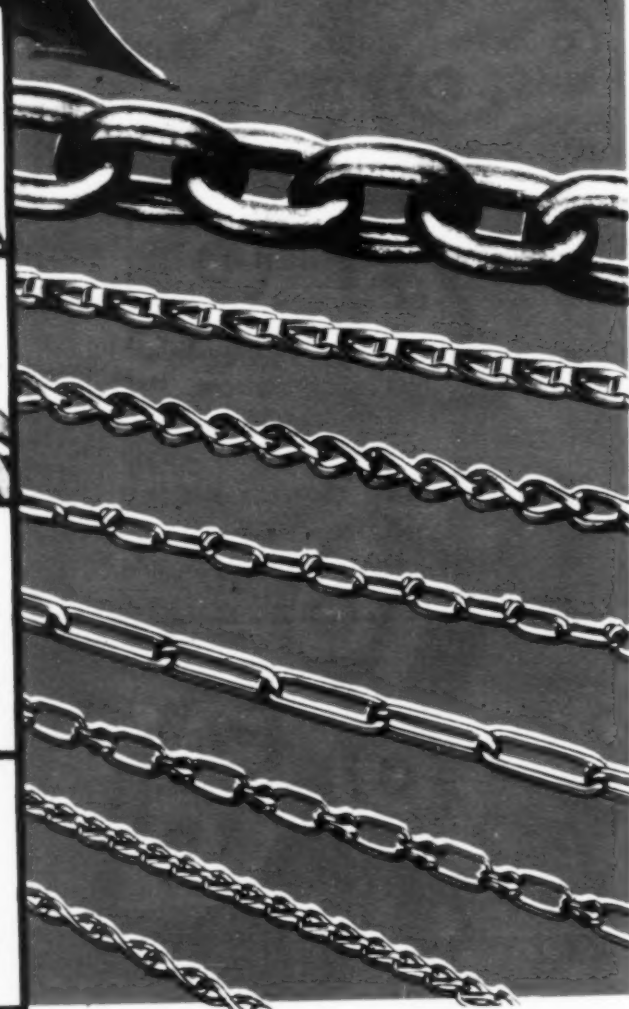
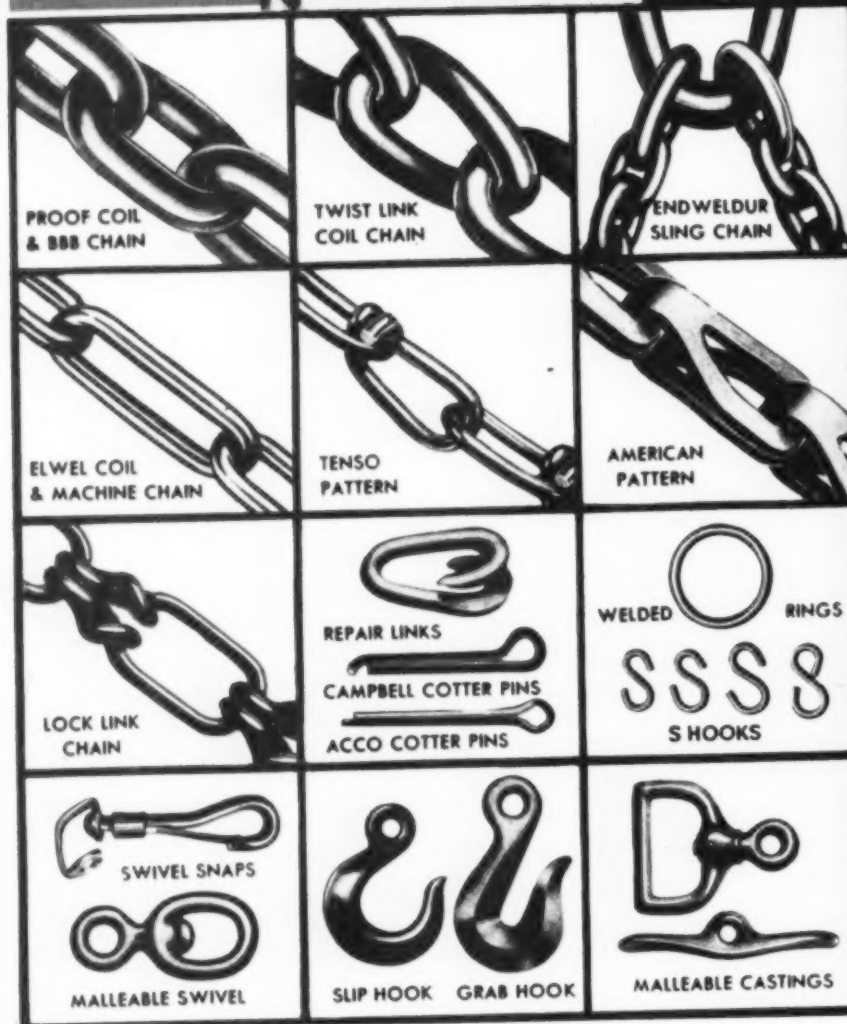
Convertible **LIMA** Shovels
Cranes
Draglines

SHOVELS, 1/4 YD. to 3 YDS. DRAGLINES, VARIABLE CRANES, 13 TONS to 60 TONS



Complete

All Types of
Welded and
Weldless Chains,
Fittings and
Attachments



CHAIN SERVICE

● Chain equipment problems, whatever they be, find solution in the complete lines of American chains, fittings and attachments. Whether jobs require our new Endweldur Chains in the toughest alloy steel—or whether they are handled best with good iron chain—the American line offers what is right for the work in hand. . . . Back of every chain we make are years of patient research and development work in field and laboratory, honest and unstinted man-hours of labor in our mills, and every manufacturing safeguard we can employ.

Modern Chain Engineering Meets Your Demands

● American Chain engineers serve in two important ways. They provide the best chains for countless purposes—and they show how to put the most suitable chain equipment to work in the best way. They invite discussions of chain problems.

Organized to Serve You Efficiently

● The illustrations in this advertisement cover only a few of the many types of chains, fittings and attachments manufactured by American Chain. Ample stocks are located at strategic points throughout the country with the distributors who supply your needs. You can be sure of getting the American Chain equipment you want without delay.

Send for this FREE booklet. It gives all the important facts about ENDWELDUR Sling Chains. Consult us (with no obligation) on any chain problem. Address American Chain & Cable Company, Inc., Bridgeport, Conn.



AMERICAN CHAIN & CABLE COMPANY, Inc.

AMERICAN CHAIN DIVISION • AMERICAN CABLE DIVISION • ANDREW C. CAMPBELL DIVISION • FORD CHAIN BLOCK DIVISION • HAZARD WIRE ROPE DIVISION • HIGHLAND IRON AND STEEL DIVISION • MANLEY MANUFACTURING DIVISION • OWEN SILENT SPRING COMPANY, INC. • PAGE STEEL AND WIRE DIVISION • READING-PRATT & CADY DIVISION • READING STEEL CASTING DIVISION • WRIGHT MANUFACTURING DIVISION • IN CANADA: DOMINION CHAIN COMPANY, LTD. • IN ENGLAND: BRITISH WIRE PRODUCTS, LTD. • THE PARSONS CHAIN COMPANY, LTD. • *In Business for Your Safety*

IT'S Smooth Driving WITH THESE LINER PLATES



This 15-foot shaft and 10-foot diameter tunnel are part of the sewer system in a large midwestern city. Armco Plates can be used to line tunnels, shafts or caissons.

• Tunnel men are learning from experience that Armco Liner Plates help save money and avoid trouble. Let's take a look at some of the many reasons why these sturdy, low-cost plates make for fast, smooth driving.

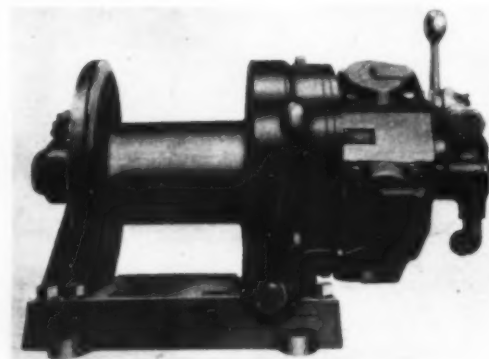
The corrugated design of Armco Tunnel Liner Plates provides safe strength without excessive weight. Thus they are easy to install. One man can handle the sectional metal units, and only structural wrenches are needed for assembly. The work moves on schedule and cost estimates are often bettered.

And here are other important savings. On a strength-weight basis Armco Plates cost less than any four-flange type. Then in many cases you actually buy fewer plates because completed rings of Armco Tunnel Liner can be spaced to take advantage of self-supporting ground.

You see, Armco Liner Plates can help you speed work and cut costs on that next tunnel job. There is a choice of sizes and gages for light or heavy-duty service. Write us for information, ARMCO DRAINAGE PRODUCTS ASSN., 5039 Curtis St., Middletown, Ohio.



SINGLE AND DOUBLE DRUM AIR HOISTS featuring 5-cylinder radial air motors are said to have "smoother torque than a straight 8." These hoists claimed to be well adapted to hoisting, hauling, dragging or scraping in mines, smelters, quarries, highway and construction work; to bridge erection



and in machine shops, sawmills, oil fields and refineries, gas and electric plants; shipping and industrial work. Additional features listed: (1) Safety design diminishing possibility of dropping load accidentally; (2) powerful brake bands with conveniently located operating lever; (3) hardened gears accurately cut and running in oil; (4) entirely sealed gear train to prevent dirt and water from reaching gears and bearings; (5) sealed-in oiling system to insure proper lubrication; (6) simple 3-point lubrication to take care of all moving parts; (7) self-centering throttle lever with automatic safety latch to hold it in neutral position.—Gardner-Denver Co., Quincy, Ill.

★ ★ ★

1-YD. FULL-REVOLVING CRAWLER MOUNTED SHOVEL, convertible to crane, dragline and pull-shovel, has incorporated in it following improvements: (1) Upper and lower bases of shovel are heat-treated alloy steel castings; (2) all high speed shafts mounted on ball or roller bearings; (3) prac-



tically all gears inclosed and running in oil; (4) uniform pressure, cone type clutches employed for swing, travel and boom hoist; (5) worm gear safety type boom hoist mechanism; (6) differential method of steering gives positive traction whether shovel is traveling straight ahead or turning; (7) "feather-touch" booster clutches employed on main drum clutches. Split-type shovel boom with single square stick. Dipper has cast manganese front. Patented "dual crowd" mechanism incorporating both independent and automatic crowds. Can be shipped completely erected on one flat car.—Northwest Engineering Co., 1728 Steger Building, Chicago, Ill.

★ ★ ★

LIGHTWEIGHT SPRAY GUN suited for delicate tinting, line stenciling, shading, blending and highlighting. Especially valuable to workmen engaged in fine decorative finishing either on new or re-finished products. Low air consumption adapts it well to service departments of distributors and dealers where small or limited volume of compressed air is available. Fits hand easily, permitting forefinger to rest naturally upon trigger of gun to effect

ARMSTRONG BROS.



Better PIPE TOOLS

Built to industrial standards for quality tools these are better pipe tools, improved in design and action with drop forgings, alloy steels, and hardened parts wherever they will add to performance or life. Handier, stronger, accurately made and finely finished, they make work easier, faster. They comprise the most complete line made, still each is an improved tool. The Chain Vise has drop-forged 1-piece (patented) jaws that prevent crushing or bending of smallest pipe, tubing or conduit... the patented pipe wrench has forged-in-lugs that absorb all side strain and nine other features—etc.

Solid Dies and Stocks (3 types)
Adjustable Dies and Stocks
Reaming Type Threaders (3 types)
Pipe Cutter with Knife Blade
Wheels (5 types)
Standard Chain and Post Vises
Chain Wrenches and Tongs (5 types)
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Write today for Catalog
C-39 the most complete
line of Pipe Tools made.

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MAKE BIGGER PROFITS

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GASOLINE
POWERED

CONCRETE VIBRATORS



**Foolproof!
Self-Contained!
No Wires!
No Auxiliary
Power Plants
Required!**

MALL 3 H.P. gasoline powered vibrators deliver 7000 vibration frequencies per minute. Pneumatic mounting provides unusual portability.

You save on power, time, labor and material. Air compressors or generator sets are not required. The variable speeds make them adaptable to dozens of uses — CONCRETE VIBRATING, CONCRETE SURFACING, SAWING, FORM SANDING, PUMPING, WIRE BRUSHING, GRINDING, SHARPENING TOOLS AND BITS, DRILLING in WOOD, BRICK, CONCRETE, IRON or STEEL.

Write today for free demonstration! Electric and pneumatic models also available.



Placing concrete in heavily reinforced sections on deck slabs.

MALL TOOL COMPANY

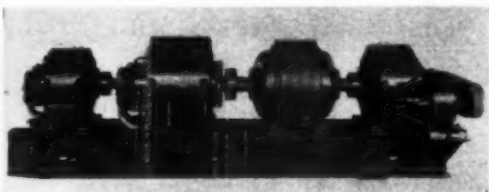
7757 SOUTH CHICAGO AVENUE CHICAGO, ILLINOIS



ready control. Available in three nozzle combinations which are adjustable for either round or fan spray applications, gun offers maximum spray width of 3 in. Control of width and density of spray said to be accurate and simple.—DeVilbiss Co., 300 Phillips Ave., Toledo, Ohio.

★ ★ ★

BALL-BEARING 5-UNIT MOTOR-GENERATOR SET. improved type, for 4-cu.yd. electric shovel induction motor consists of following units, left to right: 275-hp. induction motor; 165-kw., d.c. hoist generator; 54-kw. split circuit d.c. swing generator; 34-kw., d.c. crowd generator; and 12-kw. belted compound-wound d.c. exciter. Said to be easily dismantled and serviced, split-type frames being used on all d.c.



machines except small belt-driven exciter. Each machine coupled to neighbors and various minor details, such as end shields and bearings, are so arranged that removal of any individual armature or rotating element may be accomplished easily and quickly. Said to need little attention except in case of accident or deterioration from long service. By use of cradle type end shields and close coupling, length of motor-generator is kept within same limit as previous units. Unusual feature: line up of five or more ball bearings without use of flexible couplings, calling for accurate assembly, together with strong and rigid sub-base of self-supporting type suitable for three-point support on framework or foundation not entirely rigid.—General Electric Co., Schenectady, N. Y.

★ ★ ★

FOR REMOVING OIL AND MOISTURE from air and gasoline lines their manufacturers are announcing a complete line of Aridifiers in sizes from $\frac{3}{8}$ to 10



in. Foreign matter impinges on series of "propeller blades" revolving in opposite directions by force of air or gas and is collected in lower housing from which it is drawn off, as desired. Said to be easy to install in any line, interior or exterior, to operate without back pressure and to require no maintenance or attention other than periodical cleanout. Claimed to extend service life of tools powered by compressed air and to eliminate

troubles arising from condensation and freezing.—The Logan Engineering Co., 4912 Lawrence Ave., Chicago, Ill.

MARMON-HERRINGTON *All-Wheel-Drive* TRUCKS



Photo, Courtesy Davey Tree Expert Co.

DOING JOBS OTHER TRUCKS CAN'T DO ... IN SCORES OF INDUSTRIES AND FIELDS OF SERVICE

● Moving large trees, which weigh from five to twenty tons, through swampy ground, creeks, plowed fields and rough woodlands may not be *your* job—but you may have another just as tough.

Like the Davey Tree Expert Co., you may feel that what you need is a "combination locomotive, tug-boat, and mud-hungry tractor." Like them, too, you'll probably find that what you *really* need is a Marmon-Herrington *All-Wheel-Drive* Ford or Heavy Duty Truck!

For, besides giving a lower equipment investment, and materially reduced operating costs, Marmon-Herrington *All-Wheel-Drive* will enable you to tackle hauling jobs you haven't been able to do before.

If your work is road building, or

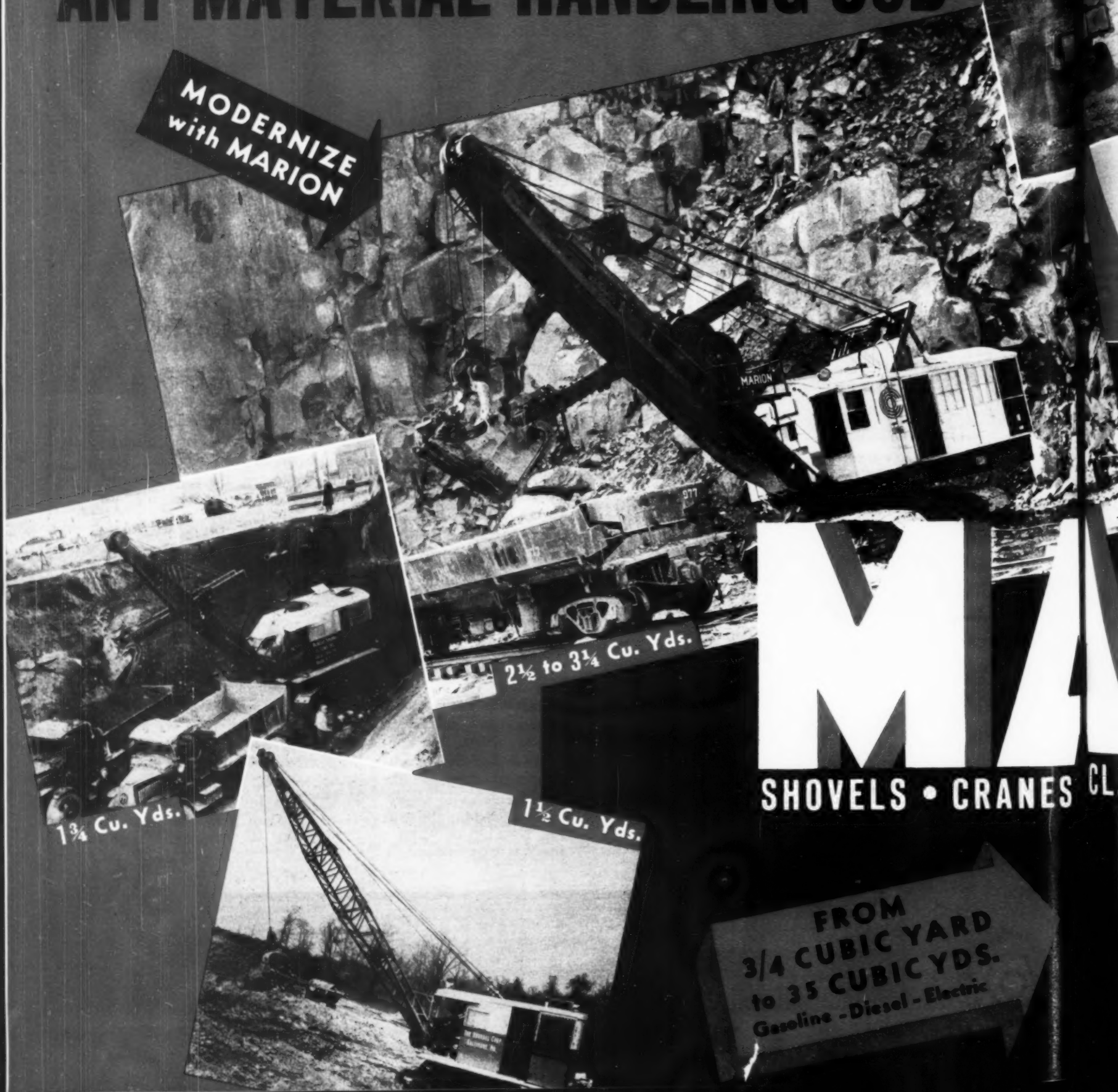
maintenance, snow removal, oil field exploration or transportation, logging, mining or any of a score of services requiring *supreme traction and power application*, these *All-Wheel-Drive* units will pull you through. If you have to haul heavy loads over slippery highways, hills and around treacherous curves, they will cut operating schedules and costs, and provide maximum safety for drivers and loads.

We convert all standard Ford trucks, passenger cars and commercial cars to *All-Wheel-Drive* and build a complete line of heavy duty *All-Wheel-Drive* trucks, with gross load capacities up to 70,000 lbs. Write for literature. Cable address, MARTON, Indianapolis, Indiana, U. S. A.

MARMON-HERRINGTON COMPANY, INC.
INDIANAPOLIS, INDIANA, U. S. A.

A COMPLETE RANGE OF **FAST WORKERS** ON ANY MATERIAL HANDLING JOB

MODERNIZE
with MARION



2½ to 3¼ Cu. Yds.

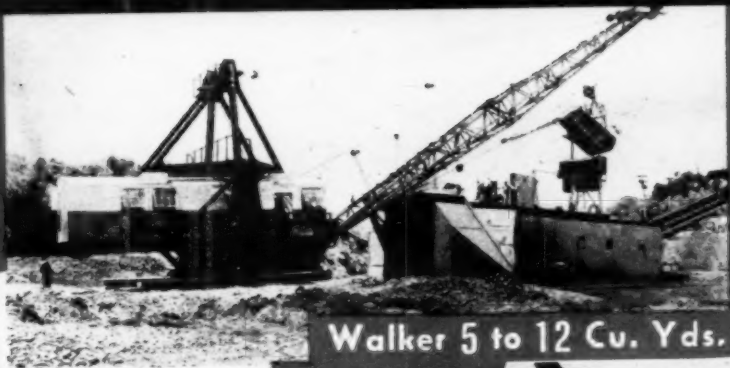
1¾ Cu. Yds.

1½ Cu. Yds.

MARION

SHOVELS • CRANES CL

FROM
¾ CUBIC YARD
to 35 CUBIC YDS.
Gasoline - Diesel - Electric



Walker 5 to 12 Cu. Yds.



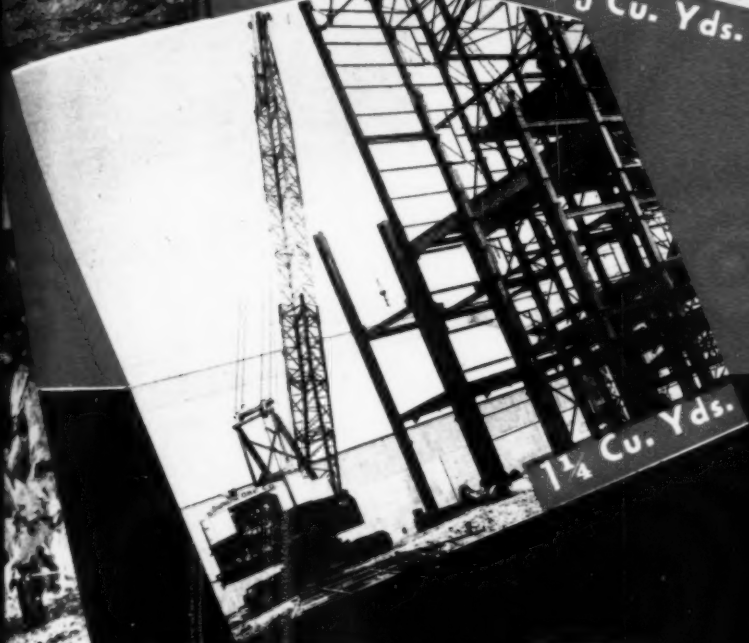
4½ to 5½ Cu. Yds.



¼ Cu. Yd.



2 to 3 Cu. Yds.



1¼ Cu. Yds.



35 Cu. Yds.

MARION

ES CLAMSHELLS • DRAGLINES • PULL-SHOVELS • WALKERS

Marion's superior design and ability to take it make your difficult jobs easy... profitable! Combining speed with accurate, finger-tip control, Marion is the quick solution to unusual problems arising in all kinds of digging, material handling, and construction. There is a fully convertible Marion, with gas, Diesel, or electric power, to help you take advantage of 1940's better business. Our engineers will gladly cooperate in the selection of equipment best suited to your needs. Write today. " " "

THE MARION STEAM SHOVEL CO. • MARION, OHIO, U. S. A.



SCHRAMM AIR COMPRESSORS FOR EVERY AIR NEED

Sizes 55 to 420 cu. ft.
Gasoline Engine or
Diesel Engine Drive
Stationary or Portable

The Schramm 105 cu. ft. utility compressor operates two heavy duty concrete breakers—is mounted on a $\frac{3}{4}$ ton truck—carries tools, equipment and men to and from the job—a money maker compressor.

When concrete must be broken, a Schramm "Utility" compressor with Cleveland busters will do it cheapest

ASK FOR BULLETIN 3900

SCHRAMM INC.

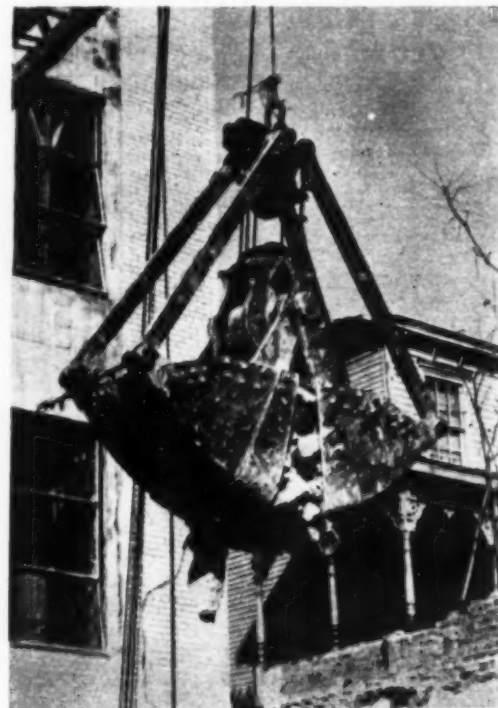
Established 1900

902 VIRGINIA AVE.
WEST CHESTER, PA.



CONSTRUCTION EQUIPMENT NEWS... Continued

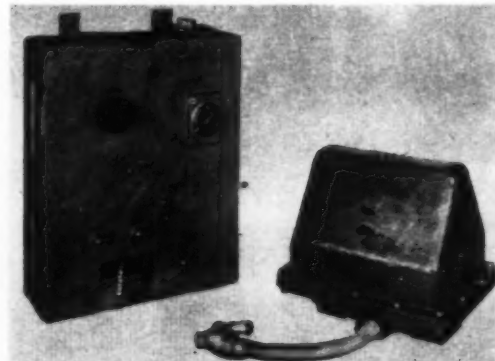
IMPROVED HEAVY-DUTY CLAMSHELL BUCKET in $\frac{3}{8}$ - to $1\frac{1}{2}$ -yd. capacities, suitable for state and municipal projects, for highway and general contractors and for railroad excavation, announces following refinements: (1) hinge pins of increased diameter; (2) heavier jaw plates; (3) teeth of special design



for various kinds of digging. Other advantages: center shaft provides extra large diameter and extra long bearings— $2\frac{1}{8}$ -in. diameter x 5-in. length for 1-yd. bucket, others in proportion; rib-reinforced, electric steel blade arms; rigid head-frame assembly; bearings fitted with renewable, heavy-duty bronze bushings and for Zerk hydraulic pressure grease lubrication which tends to force out dirt and grit and prevent abrasive wear.—George Haiss Mfg. Co., Inc., Canal Place & Rider Ave., New York City.

★ ★ ★

CONCRETE VIBRATOR AND CONTROLLER "explosion proof" model, for use in plants where atmospheric conditions are inflammable or explosive, are attached to bins, hoppers, chutes to prevent arching over and hanging up of material and to insure free flow at all times. Vibrator is heavy, pulsating



ing electro-magnet incased in thick, electric-furnace steel case with ground joints and with an armored cable lead. Remote electric control panel containing rectifier, operates switches and rheostat for controlling vibrator's power. It is inclosed in cast-iron case with ground joints and explosion-proof fittings.—The Syntro Co., 500 Lexington Ave., Homer City, Pa.

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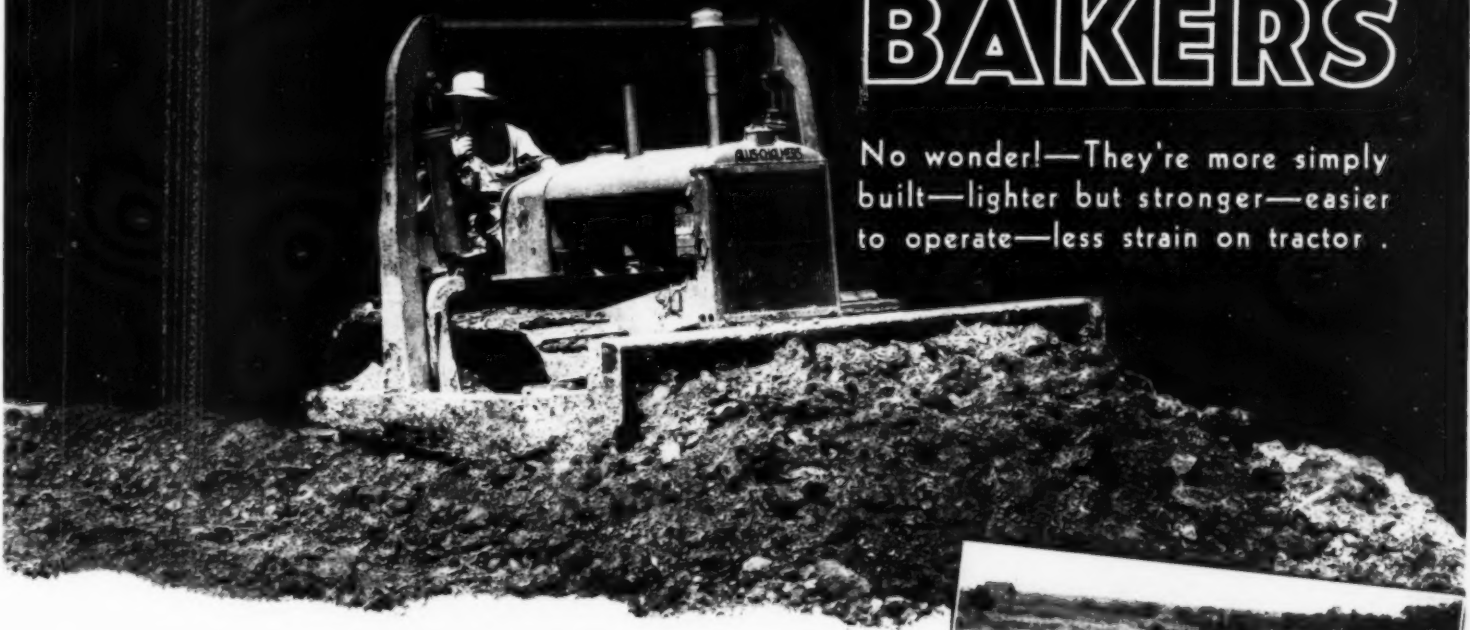
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BAKERS

No wonder!—They're more simply built—lighter but stronger—easier to operate—less strain on tractor.



Baker Bulldozers on a large dam construction job.

HYDRAULIC BULLDOZERS and GRADEBUILDERS

The outstanding superiority of Baker Hydraulic Bulldozers and Gradebuilders is recognized by leaders in the construction industry. They know Bakers are built to handle their jobs quicker, easier and more economically.

Where, except on Bakers, can you find all these features—simple, direct hydraulic lift with no gears, springs or cranks—twin-cylinder operation—balanced hydraulic system—light weight combined with great strength—tremendous down pressure—accurate hydraulic control—simple mounting—no undue strain on tractor—interchangeable moldboards?

You don't know real Bulldozer performance until you use Bakers. Mount Bakers on your tractors and see the difference.

*Write for latest bulletins on Bulldozers,
Scrapers or any Baker product.*

THE BAKER MANUFACTURING CO.

568 Stanford Avenue, Springfield, Illinois



A Baker Hydraulic Scraper easily filled to capacity on a road job in Missouri.

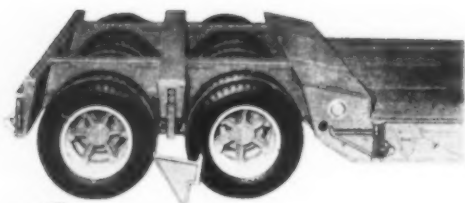
HYDRAULIC SCRAPERS

Unlike ordinary scrapers, Bakers dig at a constant, flat angle, regardless of the depth of cut. They require far less power to fill to capacity and leave your grade smooth, with no unsightly holes or waves. Performance proves that Bakers are the easiest loading two-wheel scrapers. Three sizes in two-wheel models—3, 5 and 6 cubic yard capacities for any make tractor.

• BAKER TRACTOR EQUIPMENT •

BULLDOZERS • GRADEBUILDERS • SCRAPERS • ROOTERS • ROAD DISCS • MAINTAINERS • SNOW PLOWS

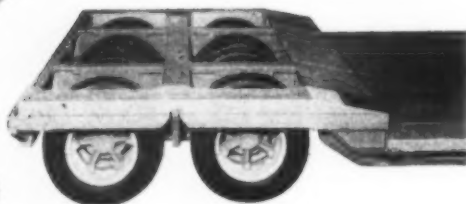
HOW ROGERS



● Rogers builds trailers, conforming to the 8 ft. legal limit of many states, in capacities up to 60 tons—but they need not be limited to 8 ft. loads.

Welded steel brackets shown above may be swung out in a few seconds to receive side members.

EXPANDS trailer USEFULNESS



● Above is shown the newly improved design of expandable trailer—with 20 side brackets supporting non-skid wooden side members—an 8 ft. trailer expanded to 10 feet.

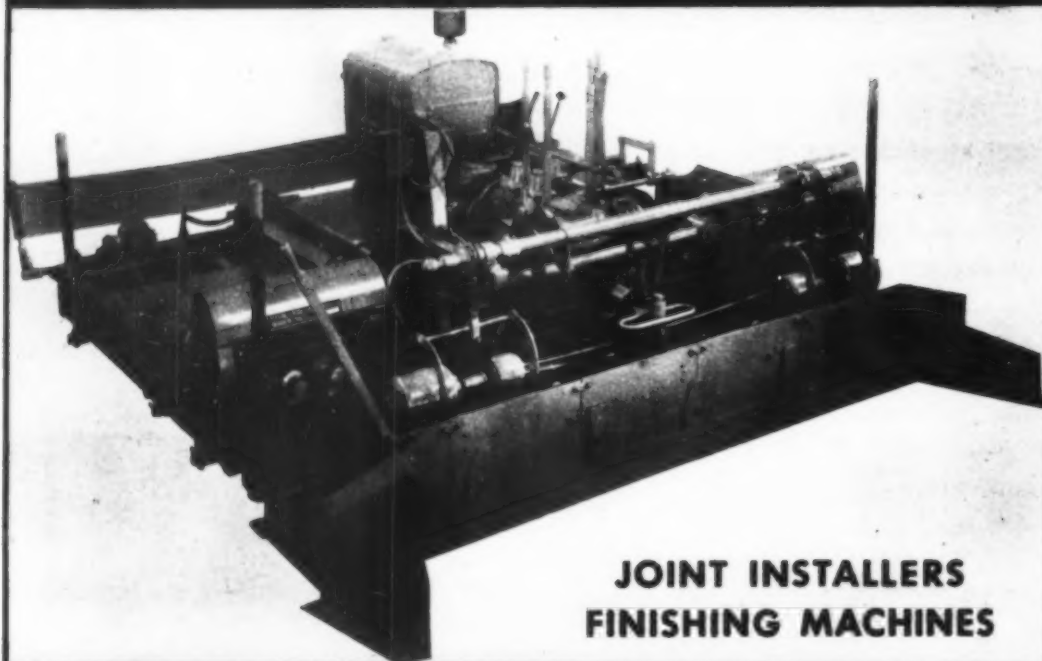
After hauling an extra wide load the side members are removed and the brackets folded compactly against the trailer, which returns more quickly than would otherwise be possible.



EXPERIENCE
...built it
PERFORMANCE
...sold it

ROGERS BROS. CORP.
220 ORCHARD ST. • ALBION, PA.

- 2 - LEADERS - 2 -

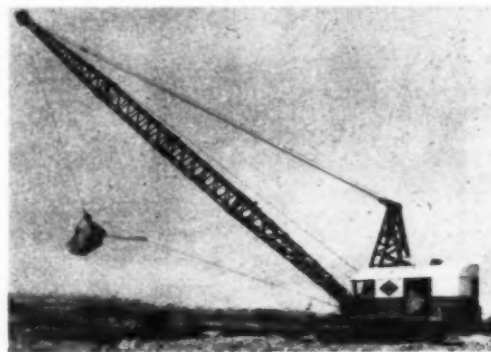


**JOINT INSTALLERS
FINISHING MACHINES**

They have the necessary weight, speed, stamina and precision to insure profit.

FLEXIBLE ROAD JOINT MACHINE CO.
WARREN, OHIO

COMBINATION SHOVEL AND DRAGLINE is constructed for heavy-duty activity in quarries, strip mines, drainage and levee work where capacity and wide working ranges are necessary. When equipped as shovel, machine has 30-ft. boom, 20-ft. dipper handle and 3-yd. bucket. For special work, such as open-pit mines, unit can be equipped with 42-ft. boom, 32-ft. dipper handle and 2½-yd. dipper. Features: (1) Box-type electrically welded shovel



boom and dipper handle; (2) only three levers and two foot pedals necessary to control three major operations, hoist, swing and crowd; (3) inside expanding clutches with housings cooled through radiator fins; (4) hoist brake and clutch housings, equipped with roller bearings; (5) hoist clutches provided with vacuum power assistors operating through toggles which makes possible lowering of load with clutch engaged, especially handy in crane work; (6) each major operation independent of other, making it possible to hoist, travel, swing and raise or lower boom simultaneously; (7) extra large-diameter drums; (8) helical cut gears; (9) one-piece base casting crawler truck, 18 ft. 11 in. long and 13 ft. 1 in. wide, with seven axles, on ends of which revolve fourteen open-type self-cleaning rollers; (10) well ventilated cab. Machine said to be easily convertible in field for dragline or crane service and may be had with diesel, oil or electric power. —Lima Locomotive Works, Inc., Lima, Ohio.

★ ★ ★

¾-YD. EXCAVATOR, said to be unusually compact and light and yet designed to handle tough excavating or material handling jobs. Features claimed:



simplicity of design, all-welded construction and fewer working parts. All gears, shafting, bearings and other rotating parts move in bath of oil permanently sealed against metal cutting abrasives.—Universal Power Shovel Corp., Milwaukee, Wis.

★ ★ ★

PNEUMATIC TRACTOR TIRE, identified as Type X Sure Grip, said to be ideal for changeovers on tractors which formerly operated either without rubber or on tires of low non-skid pattern for economy reasons. Features self-cleaning cleated open center tread and circumferential rib at shoulder, said to provide increased resistance to scuffing and chafing of sidewalls.—Goodyear Tire & Rubber Co., Akron, Ohio.

not just another
"PRICE HOIST"
but a "PRICE HOIST"
with . . .

QUALITY



THE
sensational

MODEL 20 AMERICAN *General Purpose* HOIST

Has Many Features Found In No Other Hoist In Its Price Class

Forget about all the small hoists you have ever seen when you consider the AMERICAN Model 20 General Purpose Hoist. It's a Genuine AMERICAN Hoist, with all that famous AMERICAN Quality, shrunk down in size and price — especially price — to fit the work and equipment budget of the small contractor and industrial user.

Write for Bulletin 100-H-0 and price — and if you will need a small hoist this spring, better put in your bid early; from the way the demand for the Model 20 is shaping up now we can see that we have our work cut out to satisfy the demand.

AMERICAN
Quality
TOOK THIS
ONE IN ITS
STRIDE

AMERICAN HOIST & DERRICK CO.

NEW YORK

SAINT PAUL, MINNESOTA

CHICAGO

AMERICAN TERRY DERRICK CO.
SOUTH KEARNY, N. J.

FOR SAFE WIRE ROPE FASTENINGS



STANDARDIZE on the Genuine *CROSBY CLIP*

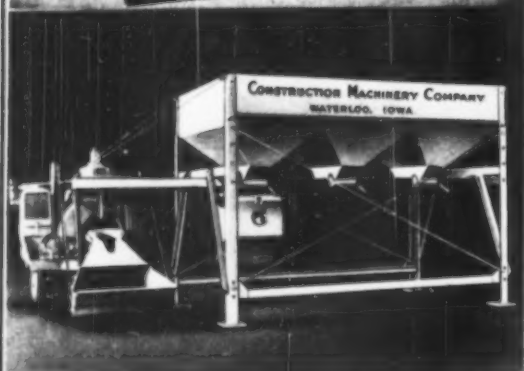
PERFECT GRIP • DROP FORGED STEEL • HOT DIP GALVANIZED

safe since 1883

DEALERS WITH STOCK IN ALL PRINCIPAL CITIES

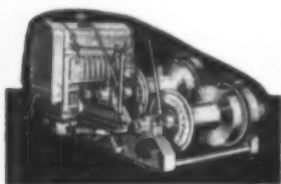


THE Sensational NEW C.M.C. BIN BATCHER



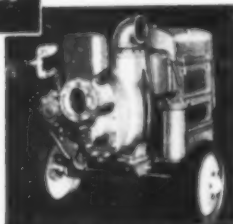
TAKES THE ADVANTAGES OF A CENTRAL MIXING PLANT TO EVERY JOB AT UNBELIEVABLY LOW COST!

A great labor and money-saver for contractors, products and pipe plants. With CMC 10S or 14S Mixer makes an unbeatable combination. Scale has beam for each aggregate. Ideal for charging small transit fleets or dry batching trucks. Bins can be loaded by crane or conveyor, or on some jobs can be set up for direct truck deliveries from ramp, side hill or bridge approach. Trailing trucks available if desired. Get the facts today on this NEW PIECE of money-making equipment. Exclusive with CMC.



New CMC Hoists—low priced—high quality. Single and double drum up to 40 H.P. More economical to own—safer to use.

New CMC Dual Prime and Well Point Pumps. Most efficient and complete line in the industry. All sizes for all purposes.



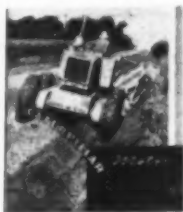
Get the CMC Catalog just out showing the very latest in Concrete, Plaster, Mortar and Bituminous Mixers, Pumps, Power Saws, Hoisting and placing equipment. Carts and Barrows.

CONSTRUCTION MACHINERY COMPANY
WATERLOO, IOWA

NEWS FROM MANUFACTURERS About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use

MOTOR GRADERS—Caterpillar Tractor Co., Peoria, Ill. (31 pp., illustrated.) Three sizes of self-propelled (66, 46, and 32 h.p.) powered either by diesel or gasoline engines. Two largest models have 12-ft.



blades and leaning-wheel front axles; smallest model has 10-ft. blade. Design features include rear-mounted engine, low-pressure tires, improved bank-cutting blade positions and full-revolving blade. Tandem and single drives. Mechanical power controls. Drive is fully enclosed. Specifications in tabular form.

★ ★ ★

LEATHER BELTING—Chicago Belting Co., 113 North Green St., Chicago, Ill. (24 pp., illustrated.) Tension welded leather belting for group or individual machine drives. Belts are cemented together while pulled out under tension so that surplus stretch is permanently removed. Typical applications illustrated. Flat, round and V-shaped belting.

★ ★ ★

WELDED CHAIN AND ATTACHMENTS—American Chain & Cable Co., Bridgeport, Conn. (53 pp., illustrated.) Types of welded chain illustrated and described include pool coil, twist link coil, high-test steel, steel loading, cast steel, conveyor, dredge, stud-link and sling. A 16-p. insert is devoted to sling chains, with notes on their proper care. Several pages deal with hooks, shackles and cold shuts. There is a section on Elwell coil chain and truck chain. Tables indicate sizes, dimensions, weights, breaking strengths and recommended safe loads.

★ ★ ★

CUT-BACK ASPHALTS—The Asphalt Institute, 801 Second Ave., New York, N. Y. (14 pp., illustrated with diagrams). Revised specifications for cut-back asphalts, adopted by the Asphalt Institute Dec. 13, 1939, eliminate discrepancies in old specifications by setting up six grades of rapid-curing and six grades of medium-curing cut-backs, with definitive viscosity limits and distillation requirements for each grade. Complete specifications are given for twelve grades, and table of suggested uses is appended to guide highway engineer when in doubt.

★ ★ ★

ONE YARD 15-TON CRANE—Bay City Shovels, Inc., Bay City, Mich. (8 pp., illustrated.) Bulletin describes Model 55 crane, giving details of construction and including photos of unit-cast alloy steel bases for lower car body and revolving table; electric power dipper trip; heavy-duty chain crowd; helical gears with transmission in oil. Complete specifications and working ranges for shovel, crane, dragline and trench hoe service.

★ ★ ★

POWER SHOVEL-CRANE-DAGLINE—General Excavator Co., Marion, Ohio. (16 pp., illustrated.) Describes Type 30 crawler-mounted power shovel-crane-dagline, a high-speed machine in medium weight class in sizes of 1/2, 3/4 and 1 cu.yd. Design features include unit cast steel truck frame and side frames, special alloy steels, anti-friction bearings, vacuum dipper trip, full-vision cab, low center of gravity and machinery located far back of center pin. Gasoline, diesel or electric power. Can be equipped, also, as pull-shovel or skimmer or as a truck-crane.



DRIVES MORE PILES PER DOLLAR

SUPER-VULCAN
OPEN TYPE DIFFERENTIAL ACTING
PILE HAMMERS - 18C - 30C - 50C

Rugged strength—simple design—positive action—easy, inexpensive operation.
Uses 25% to 35% less steam per blow.
Delivers twice the number of blows per minute.

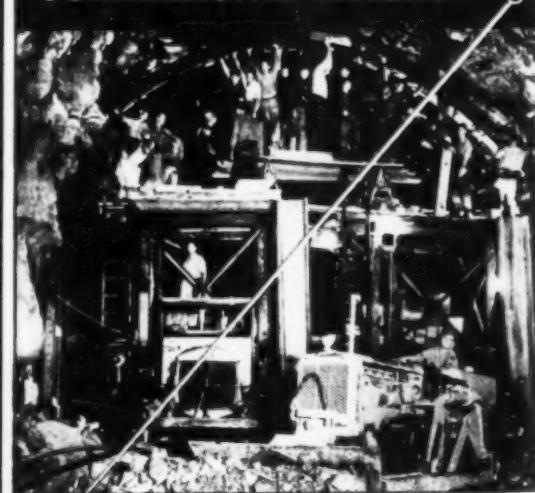
VULCAN IRON WORKS
Since 1832
331 N. BELL AVE. CHICAGO, ILL.



★ Fits same leaders—uses same accessories as Vulcan Single-Acting Pile Hammers and has same widely approved characteristics.



COMMERCIAL LINERS...



THE SHORTEST DISTANCE TO TUNNEL CONSTRUCTION SAVINGS ON THE PENNSYLVANIA TURNPIKE!

Like the proverbial straight line that characterizes the Pennsylvania Turnpike itself, COMMERCIAL SHEARING'S Tunnel Supports are the quickest and surest way to arrive at substantial savings on all tunnel construction jobs. Witness the tunnel being driven by the Hunkin-Conkey Construction Co. . . they chose these Tunnel Supports because speed was particularly essential, due to the short time allowed for completion. And, aside from the benefits of faster installation, COMMERCIAL Tunnel Supports also save time and yardage on excavation and concrete. They're adaptable to every size of tunnel. Write for complete information.

**THE COMMERCIAL
SHEARING & STAMPING CO.**
YOUNGSTOWN, OHIO

PILE DRIVING EQUIPMENT—Union Iron Works, Inc., Elizabeth, N. J. (30 pp., illustrated.) Latest models of double-acting pile hammers for large, heavy piling. Sizes range from units weighing 100 lb. up to 21,000 lb. Design features include one-piece frame, nickel semi-steel casting with tensile strength of 45,000 lb. per square inch, inclosed working parts, cylinder and ram guides cast integral in frame for accurate alignment of reciprocating parts. All sizes can be used inverted to extract piles. Variety of sleeve-type bases for driving different kinds of piling without damage. Also drawings of driving leads and handling equipment for both land and marine work and rigging for pulling piles.

★ ★ ★

MIXER FOR ROAD STABILIZATION—Seaman Motors, Milwaukee, Wis. (4 pp., illustrated.) Gives specifications and uses of Pulvi-Mixer, mechanical mixing unit drawn by tractor and driven by power take-off which rotates transverse shaft carrying spring tines mounted on double torsion springs. Made in sizes 3 to 12 ft. in width and equipped with twelve revolving tines per foot, machine pulverizes soil and speeds mixing operations on stabilization projects involving sand-clay, clay-gravel, portland cement, bituminous materials, calcium chloride and sodium chloride. Also used to loosen fills before sheepfoot tamping.

★ ★ ★

First Shield

DIGS

CHICAGO SUBWAY

(Continued from page 53)

was installed against which the first shove of the jacks was made.

In operation, the shield is moved forward 33 in. and a 33-in. liner plate is placed in position. This primary liner section then becomes the base for the next shove of the jacks. A tail at the rear of the shield prevents a cave-in during the placing of the section of liner plate. To keep the shield progressing forward on the determined line, transit readings are made before and after each shove. Alignment is maintained by varying the pressure on the jacks circling the shield.

This first shield to get into operation is the west unit of the pair on South State St. They will go directly up State St. and connect with the twin tubes recently placed under the Chicago River. The other pair of shields in the La Salle St. tunnel move eastward along Lake St. to Dearborn St., then turn and go south on Dearborn St. to Van Buren St. where the present construction will end.

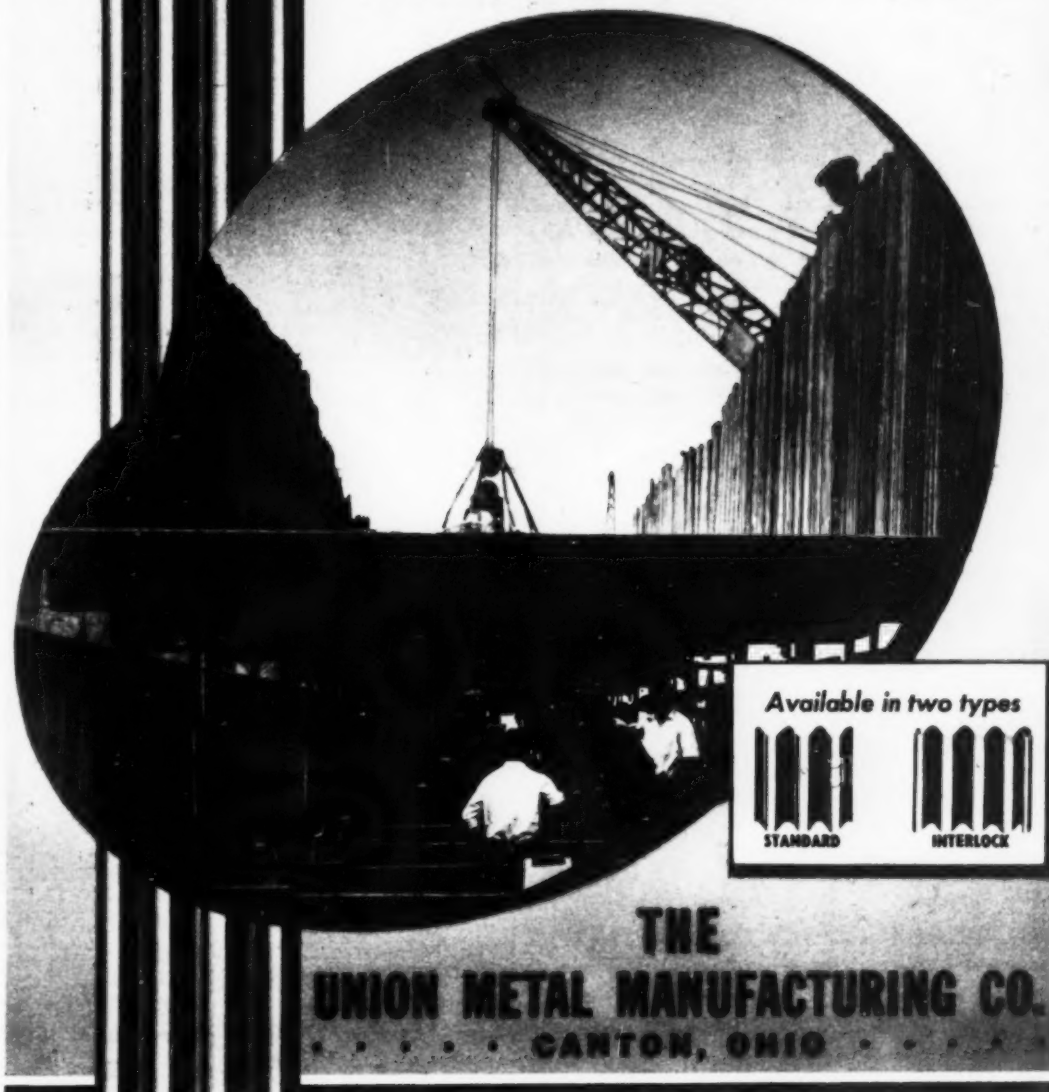
In the four shields the total number of shop rivets and bolts is 72,196 with a weight of 58,748 lb. The total number of field rivets and bolts is 24,432, with a weight of 28,936 lb.

The subway is being constructed by the Chicago Department of Subways and Superhighways of which Philip Harrington is commissioner and Ralph H. Burke is chief engineer. Healy Subway Construction Co., Inc., Chicago, is the general contractor for the subway construction. The four shields were designed and constructed by Wm. B. Pollock Co., Youngstown, Ohio.

SPEED SEWER JOBS with CORRUGATED STEEL SHEET PILING

● This Chicago sewer job typifies the use of Corrugated Steel Sheet Piling in modern trench construction. Note the added working room and minimum amount of bracing. Other time and money-saving features of Corrugated Piling, in addition to strength, are light weight for speedy handling and driving, watertight design, and easy removal for use on succeeding contracts.

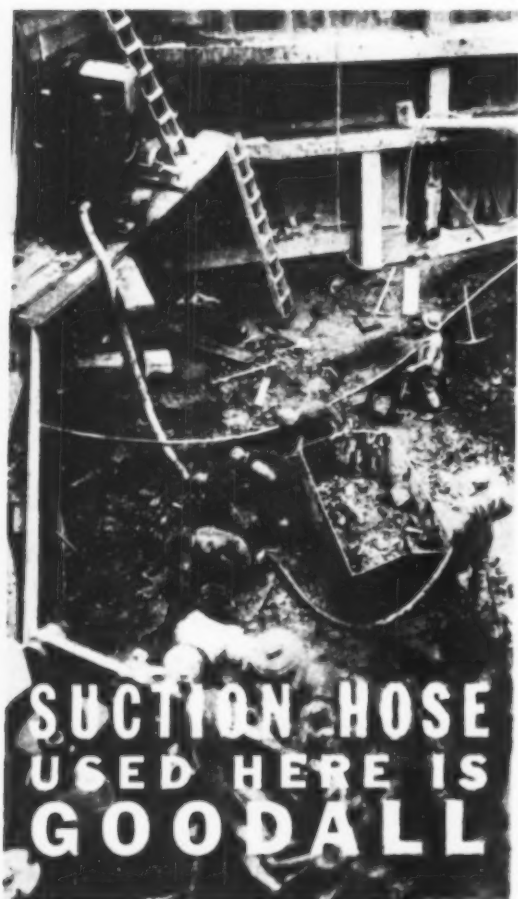
Corrugated Steel Sheet Piling has many applications, thousands of feet being supplied yearly for use in constructing dams, levees, coffer dams, sewage disposal plants, bridges and bulkheads. Illustrated catalog containing complete product specifications is yours for the asking. Address request to Dept. CM-4.



Available in two types

STANDARD INTERLOCK

THE
UNION METAL MANUFACTURING CO.
CANTON, OHIO



"NEWTYPE CORD"

For over 30 years contractors have learned that Goodall always supplies a suction hose that will stay on the job until the hole is dry.

The greatest Goodall brand developed from the experience of all these years is our "Newtype Cord" Suction and Discharge Hose.

Smooth Bore—Fast Flow—light to handle—flexible to lay—unyielding to pump pulsations or distance pressures. A money saving Suction and Discharge Hose with an exclusive elastic rubber tube compound, tough rubber hide, and between them a wire woven frame that can be battered and bent, but never broken. An accidentally crushed "Newtype" Suction hose will shape back under hammering to a smooth uninjured contour both inside and outside.

Most every important contractor has learned which Suction and Discharge Hose costs the least . . . it is the hose invented by Goodall and protected against imitation by U. S. Patent No. 1948410.

Unfortunately, you have no protection against substitution except to remember the name "Newtype Cord" and specify it on your requisition.

GOODALL RUBBER CO.

3 S. 36th Street, Phila., Pa.

New York • Pittsburgh • Chicago • Boston

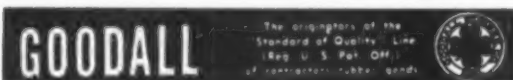
FACTORY: TRENTON, N. J. EST. 1873

GOODALL RUBBER CO. OF CALIF.

San Francisco • Los Angeles • Seattle • Salt Lake City

GOODALL RUBBER CO. OF TEXAS

Houston



Building-a-Day Pace

ON LOS ANGELES HOUSING PROJECT

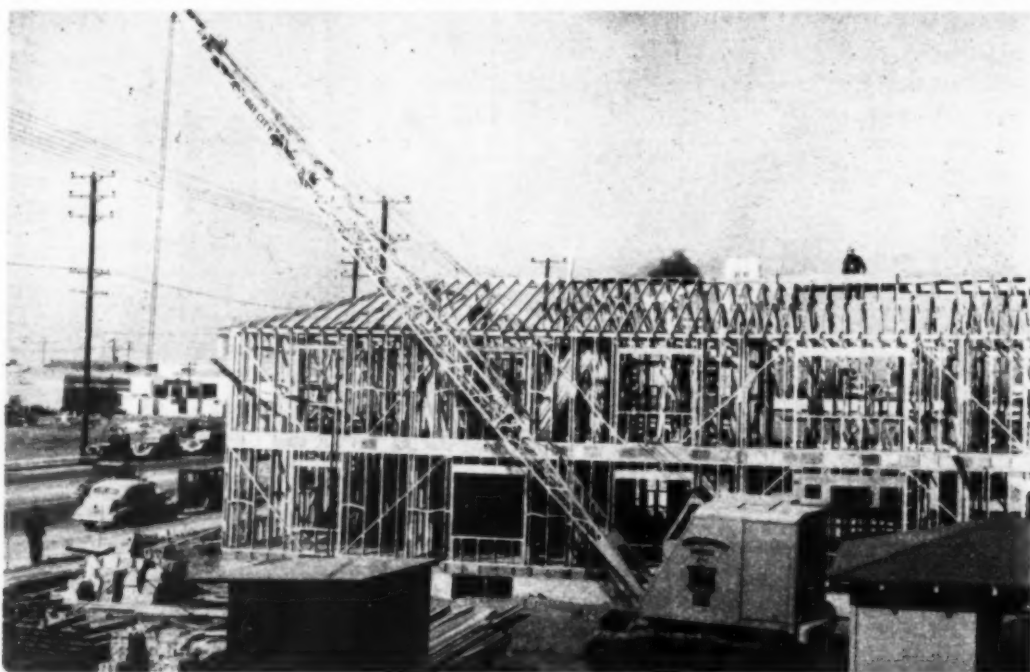
(Continued from page 52)

thing day after day, as crews moved from one building to the next. With all 143 of the buildings under way at once, crews were so coordinated that each competed with others to keep ahead of succeeding operations and up with the crew ahead.

For pouring concrete, runways of light steel standards were built with adjustable legs to compensate for varying ground slopes. Bents were in pairs, braced with bolted steel tubing and designed so that two men could carry a section from building to building without taking it apart. On these standards were laid floor panels (2x4's and 1x6's) that served as runways for concrete buggies. Concrete came to the job ready mixed, was lifted by a portable

bundled and marked for each individual building. Records were so kept that buildings could be requisitioned and shipped on short notice from mill to job in entire units. Mill storage yard and the truck delivery system supplying the job were organized, as were other phases of the project, so that supply of materials would be in continuous flow timed to steady and uniform progress.

Prefabrication made it possible to assemble framing on the job without use of a carpenter's handsaw except on rare occasions. The resultant closeness of joint fittings gave members full bearing and much stronger frames than could have been obtained by handcutting. Materials



MATERIALS FOR SECOND FLOOR AND ROOF were hoisted by crawler crane with 50-ft. boom.

conveyor belt to a hopper under which the hand buggies received their loads by gravity.

From floor to roof, the greatest accuracy was necessary in laying out the buildings because all lumber, piping, electric conduits, cabinets, linoleum, etc. were cut or prefabricated before being brought to the job. Hence, in order to insure perfect fits, templets were made up for each type of unit and were used to mark the exact positions of all studdings, openings, electrical outlets, plumbing fixture centers, etc. Nine different architectural designs were used and different combinations of parts of these were made to avoid monotonous uniformity.

All framing lumber was cut to length and much of it was prefabricated in a mill on the waterfront, 24 mi. from the job. The lumber was air-dried from one to three or four months before being worked. After being cut and prefabricated at the mill, all pieces were assembled,

for second floor and roof were hoisted by crawler crane with 50-ft. boom. Trussed rafters were assembled on the ground where they were nailed over a templet (mounted on skids) and were then hoisted bodily into place. Power-driven saws for hand use cut subflooring and roof sheeting.

On completion of rough framing, templets were made for all casework and cases were built to exact size in the shop. All frames, as well as interior and exterior trim pieces, were primed all around before delivery to the job. Hence, fitting on the job was practically obviated and installation normally consisted of simply nailing into place.

After grading was finished the first crew was made up of laborers doing excavation. Then came the form erection crew followed by the men that set up concrete buggy runways. Concrete-pouring crews were followed by those that moved runways and then came the series of super-

(Continued on page 106)

Truck Buyers Demand Facts— CHEVROLET GIVES *Certified Proof!*



See your Chevrolet dealer for a copy of the booklet "Certified Proof." It contains all of the figures relative to Chevrolet truck test runs.



For two years this 1½-ton Chevrolet truck has been engaged in a truck run without parallel either in the history of the automotive industry or in the records of the American Automobile Association. The truck has operated day after day, in all kinds of weather, and on all kinds of roads.

Here are facts about Chevrolet truck performance on the longest truck test run ever conducted under the supervision of the American Automobile Association, using a stock 1½-ton Chevrolet truck, and traveling through Canada, Mexico, and every State in the Union.

Number of miles	100,015.9
Payload	4590 lb.
<small>(exclusive of driver and observer)</small>	
Gross weight	9260 lb.
<small>(with driver and observer)</small>	
Average speed	33.07 miles per hour
Average miles per gallon of gasoline	15.10
Oil actually consumed	93.29 quarts
Total cost for repairs, replacements (including twelve tires), gas, oil and lubrication	\$0.00419 per ton-mile

These facts prove conclusively that Chevrolet trucks are low in operating and maintenance costs, and are exceptionally dependable and durable under the hardest usage.

CHEVROLET MOTOR DIVISION, General Motors Sales Corporation
DETROIT, MICHIGAN



BEST HAULERS • BEST SAVERS • BEST SELLERS

Simplified LOADING

LOADING bore holes is simpler, less hazardous, when PRIMACORD-BICKFORD Detonating Fuse is used. No detonating caps are needed in the holes. Primacord—insensitive itself to friction, fire and ordinary shocks—acts as the detonating agent. Running the full depth of the hole, in close contact with the entire load, Primacord gives each cartridge the extra power of a primer cartridge. Loading, stemming and tamping may be done quickly and efficiently.

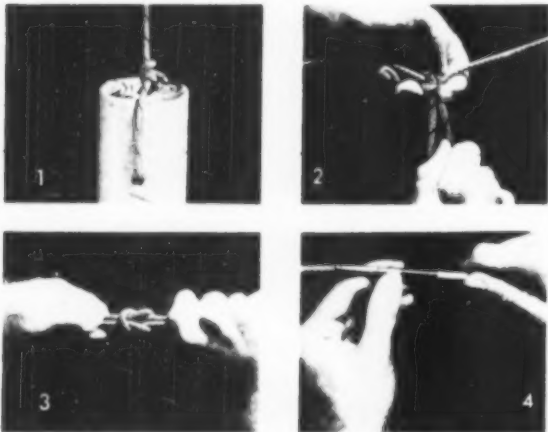
When the load is ready, and the Primacord in each hole is properly connected to the main line, a single Fuse Cap or Electric Blasting Cap, attached to one end of the Primacord, sets off the entire blast in planned rotation. Primacord-Bickford makes large well-drill blasts practicable and profitable—and is widely used for smaller blasting.

**The ENSIGN-BICKFORD
COMPANY**
Simsbury, Conn.

*Makers of Cordeau-Bickford
Detonating Fuse—and Safety Fuse
since 1836*

PRIMACORD-BICKFORD Detonating FUSE

PB19



1. Tie through cartridge.

2. Half hitch branch to main line.

3. Connect main line lengths with square knot.

4. Fuse and cap on end of main line.

(Continued from page 104)

structure-framing crews. Each headed by a foreman, these included separate crews for handling (a) first floor joists and subfloors; (b) first story plates and studs; (c) second floor joists and subfloors; (d) second story studs and plates; (e) rafters and roof sheeting; (f) shingling, and (g) placing all exterior trim including frame openings.

In fact, all the usual crafts used in building construction were employed, but here they were assembled in crews organized as teams, each man assigned to work that would enable him to give his team maximum aid in the game of getting each unit completed as quickly and effectively as possible. The schedule called for



EACH FAMILY UNIT IS WELL INSULATED from those adjoining, particularly against sound. Palco wool is here being packed into bathroom wall.

the completion of one building per day after the first one was finished. Throughout the job this rate was maintained and in some instances exceeded.

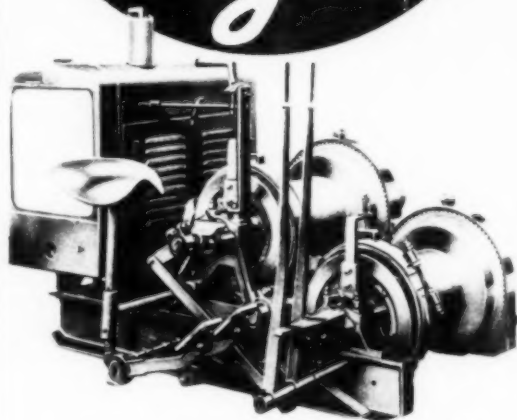
An illustration of the advantage to this job in quantity buying appears in the bill of materials. The items included:

- 17,000 cu. yd. of concrete
- 8,000,000 f.b.m. of lumber
- 500,000 sq. yd. of plaster and stucco
- 10,000 doors
- 15,000 sq. yd. of linoleum
- 17,000 window shades
- 70,000 sq. yd. of hardwood floors

Some of the items, for example, an order for 8,900 squares of "Certigrade" shingles,

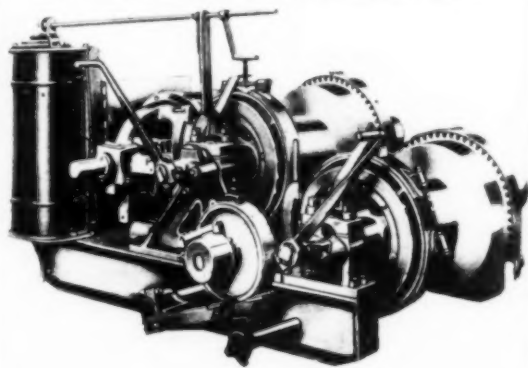
(Continued on page 108)

*For lasting
service - get a
Clyde*



Not a "one-job" machine of questionable durability, but a high quality, dependable hoist that will give years and years of satisfactory service.

Every Clyde hoist is designed for easy operation and built for lasting service. Contractors who are going places and need equipment to stand the high pressure of modern building programs can end their hoisting troubles with a Clyde.



Send for your copy of the new bulletin on Clyde electric and gasoline hoists... Bulletin K-34. It contains complete specifications and construction details.



CLYDE IRON WORKS, Inc.
Duluth • Minn.



It's going to be a headache if you don't—

put an R.B. Power Finegrader on the job this year to replace wasteful, job-jamming hand methods of finegrading.

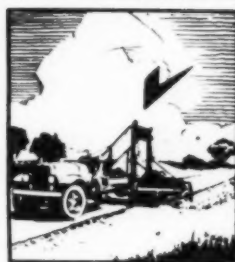
You know what it costs you to build the finegrade by hand—running a scratch-board over and over—building up the low spots by trial and error—pouring extra slab to compensate for inaccuracies—putting in as much as 7% extra material*—slowing up the paver.

You can eliminate this headache with an R.B. Finegrader—one pass over the rough grade gives you a smooth, accurate surface that's **right on the payline**—no "donation" of extra material! Plenty of grade ahead—no delays for the paving crew! No difficulties in handling grade line changes! No trouble putting material where you want it on the shoulders!

Turn your headache into profits with an R.B. Finegrader—one good job and the machine pays for itself. Get the whole story today. **BUCKEYE TRACTION DITCHER COMPANY**, Findlay, Ohio. Representatives in Principal Centers.

* The State average for loss of yield in a number of states.

Buckeye ✓



Shovels Trenchers Roadwideners . . Surface Graders Tractor Equipment Gravel Spreaders

(Continued from page 106)

supplied by the Red Cedar Shingle Bureau, were the largest of their kind on record.

When the first group of buildings was ready for occupancy and was thrown open for public inspection, 50,000 people came to view it in three days and applications were received for 150 more living units than were then available. At least a part of this popularity arises from the effective planning, with no rectangular blocks and buildings located to front on large garden areas, some more than 1,000 ft. long. Streets were located in the rear of the buildings. Landscaped areas from 75 to 250 ft. wide separate the buildings and some 600,000 trees, shrubs and plants were set out. In fact, the tract is really a 1/4 by 3/4-mi. park with only 22 per cent of the area actually occupied by buildings. Rentals, which range from \$30 to \$55 per month for 3- to 6-room apartments, include gas heat, electric hot water heater, refrigerator and tenant's choice of gas or electric stove.

The general contract was held by Lindgren & Swinerton, Inc., with John D. Davidson, vice-president and resident manager. Carl F. Hersiger was general superintendent; F. C. Harp, general foreman; H. L. Brittain, expeditor; M. C. Burns, labor foreman; and Gordon T. Davidson, head timekeeper. S. J. Brittain was architectural supervisor for Witmer & Watson, the architects, and M. J. Cassidy, Zone 5 construction supervisor, headed FHA inspectors.

★ ★ ★

Butane Gas AS TRACTOR FUEL

(Continued from page 65)

prevent the expanding gas from freezing.

The gas in the vaporizer is still under 10-lb. pressure. It is further reduced in the final pressure regulator to a point slightly below atmospheric pressure, so that suction from the engine is required to make the fuel flow. In the carburetor the vapor is mixed with the proper amount of air and delivered to the cylinder.

Filters are used to prevent rust and scale from clogging the expansion valves. It is possible to run the tractors on gasoline in the event that the butane supply is temporarily exhausted or to start under extremely cold conditions, as the carburetor can be switched to either fuel.

Until recently butane has been available only in certain localities but now it can be supplied in most sections of the country at a price ranging from 1.5 to 12c per gallon, the average being 5c. The cost of a butane tractor is well under that of diesel tractors and they have increased power and yardage and decreased maintenance and upkeep costs.



The Williams' "Vulcan" trade-mark on any hoist hook is a reliable safety symbol. It is your guarantee that each hook is carefully drop-forged and individually proof-tested to 50% beyond its rated "safe working" load. Each hook so tested is stamped with a circular "approved" mark, O, and therefore can be readily identified as "proof-tested."

All Williams "Vulcan" Hoist Hooks are forged from selected steel, specially heat-treated for maximum strength and toughness and to reduce their liability of breakage.

You can identify "Vulcan" Hooks by their orange tip. Sold by industrial distributors everywhere—write for descriptive literature.

J. H. WILLIAMS & CO.
225 Lafayette St. New York

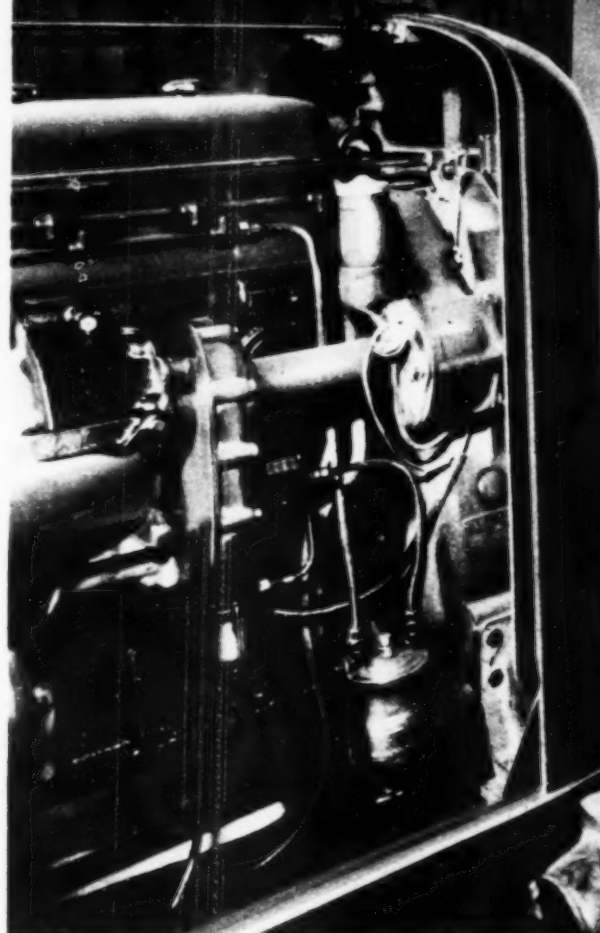


Shank and Eye Patterns up to 25 tons capacity.



\$3,360 SAVED...

AND STILL GOING STRONG!



GM DIESEL

Case History GC-37

USER: Uvalde Rock Asphalt Co., Blewett, Texas

INSTALLATION: Model 6-71 GM Diesel drives short conveyor

12" x 24" jaw crusher; bucket elevator; 100 ft.

conveyor belt; #20 grade cone crusher; two 6' x 8'

dbl. deck screens; 18 kw. generator.

PERFORMANCE: Above 90 hp. GM Diesel has been

operating 8 months with same production as formerly

at a saving of \$420 per month—fuel oil, lube oil,

and maintenance considered.

ONE GLANCE at this case history and you can see what a whale of a job this Diesel is doing—and at what a whale of a saving!

Still, that's only part of the story.

Consider the operating conditions—in Texas heat and abrasive rock dust. Its

owners estimated it couldn't take it for more than three months.

But as this is written—eight months later—that GM Diesel is still on the job, pouring out its thrifty power as faithfully as ever. And as for maintenance, they haven't had to replace or remove even an injector.

You can imagine how pleased they are with performance like that—on top of savings that already total \$3,360! They're so pleased, in fact, they're installing another GM Diesel in another crusher and hope to double those savings as a result.

Here is a typical example of the economy and dependability that have put so many GM Diesels to work throughout the engineering and construction field. Here new standards of performance are being raised and costs reduced to an almost unbelievable degree.

A major reason is the General

Motors 2-cycle principle on which the GM Diesel is designed—a principle that offers better lugging qualities, more constant speed with varying load and is also easier to operate than engines of previous design. And due to its basic simplicity and its interchangeability of parts, service problems are conspicuously minimized—a particularly important feature in isolated locations.

That's why it pays to specify GM Diesel power in your original equipment. Your equipment manufacturer has the facts about that.

And for replacement in your present equipment—or for powering portable and stationary applications of every sort—there's a GM Diesel dealer near you who has all such facts you need.

Write now for his name and address to:

Dept. 105-D

DIESEL ENGINE DIVISION

General Motors Sales Corporation
Cleveland, Ohio

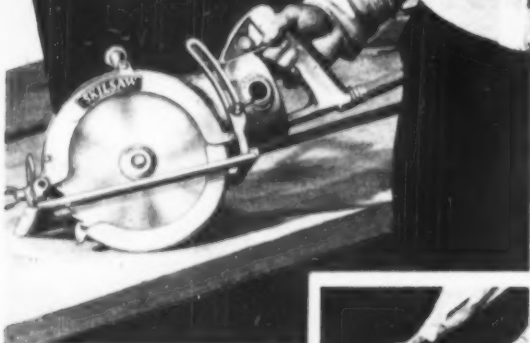
GENERAL MOTORS DIESEL



SEE THE DIESEL EXHIBIT AT THE GENERAL MOTORS BUILDING IN THE 1940 NEW YORK WORLD'S FAIR

LOOK THEM ALL
OVER and you'll buy
SKILSAW!

... because it's
BETTER BUILT
and out-lasts
all others!



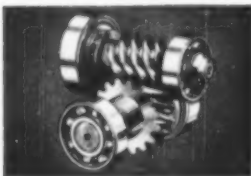
SKILSAW IS MORE FOR
YOUR MONEY...Lighter..Easier
to Use..Out-Performs them All!

Take this friendly tip if you're confused by rival claims for electric hand saws: — Don't merely listen... LOOK at them all, COMPARE them all, TRY them all on your own work, under your own conditions. If you buy this way — you'll buy SKILSAW because no other saw can give you all the time-saving, cost-cutting, profit-making features of SKILSAW!

It's no accident that more contractors use SKILSAW than all other makes combined. SKILSAW was the FIRST in the field, back in 1920... but it's the FIRST IN SALES today because constant improvements have made it the BEST in construction features and operating performance. It is lighter, better balanced, more powerful, will do more sawing jobs quicker and better. Works from light socket to 9 POWERFUL SIZES for wood, metal, stone and compositions.

SKILSAW, INC.,
5045 Elston Avenue, Chicago

36 East 22nd St., New York—182 Main St., Buffalo—52 Brookline Ave., Boston
15 N. 21st St., Philadelphia—2124 Main St., Dallas—918 Union Street, New Orleans—29 North Ave., N. W., Atlanta—1253 South Flower St., Los Angeles—2965 Webster St., Oakland—Canadian Branch: 85 Deloraine Ave., Toronto.

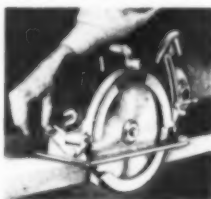


Gears machined from finest steels and tough secret-process bronze alloy, last longer, run quieter. Oversize bearings, spaced widely apart on shaft, insure smooth operation, eliminate vibration under heaviest loads!

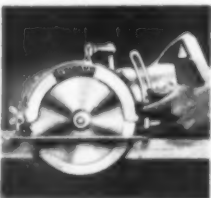


Changing the Skilsaw blade is simple—just take out the stud bolt without removing any screws or other parts. Blade is on the left side of machine, so you can line up cut clearly, saw accurately in all positions!

Handle at the rear provides perfectly natural control of Skilsaw in all positions for more accurate cutting. The position of the top handle keeps operator's guide hand away from the blade, on both straight and bevel cuts.



Bevel-cutting is easy and quick with Skilsaw — the bevel adjustment is controlled by this one wing-nut on a scale that is graduated up to 45°. That's why you save so much time cutting 1/4, 1/2, 3/4, and full pitch rafters.



Telescoping guard rotates automatically on ball bearings—Skilsaw is always safe and sure. Base is supported at front and rear for rigidity and accuracy; adjusted for depth of cut by loosening one wing-nut!

PUTTING CONSTRUCTION INTO *Reverse Gear*

(Continued from page 56)

stripping crews, who remove all doors, windows, millwork, mantels, etc. Following the completion of the gutting and stripping work, come the roofing crews. After roofing is removed and salvaged the way is paved for the wrecking crews. After a given area is cleared, the clean-up crews come in and complete the job.

Wrecking is, in reality, construction in reverse gear.

The job of salvage and sales begins at the actual demolition site. Special tools, such as floor bars and roofing bars, are used for specific jobs to aid in salvaging materials to their maximum value. All materials then are hauled to established job site warehouses and yards, sorted, reconditioned and reclaimed into merchantable, usable building materials. All lumber is graded and stacked into sorted thickness, widths, and lengths.

Plumbing fixtures are thoroughly tested, disinfected and made ready to conform to the sanitary code requirements of the district. Heating and electrical appliances and fixtures, together with all pipe, wiring and fittings, etc. are similarly made ready and reclaimed for immediate use.

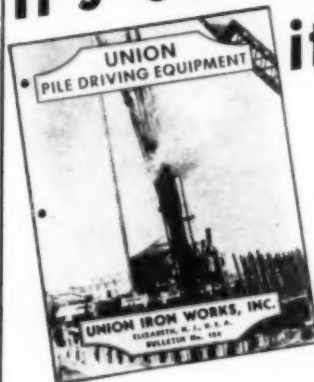
Demolition Carefully Scheduled

The demolition of a large slum-clearance project is a carefully scheduled operation. The exact amount of work that will be necessary on each working day is determined in advance in order to conclude the job on schedule time. Charts and graphs are made up for each job. Reference to these charts at the end of each working day tells the general superintendent at a glance exactly what progress the job has made toward completion.

The accompanying photographs give an idea of the size of a typical slum clearance job. These photographs were taken at the Louisville, Ky. East End slum-clearance project, where there were approximately 480 buildings to wreck. In addition to this project, a large scale job, comprising 550 buildings at Cincinnati, Ohio, was completed in only 75 calendar days.

The Cleveland Wrecking Co. has had many large contracts of this type. During the period following the war, it wrecked army cantonments at Chillicothe, Ohio and Atlanta, Ga., as well as many others of this type. Recently, it handled the wrecking required for the new approach to the San Francisco-Oakland Bay Bridge, one of the largest wrecking contracts ever placed. The average daily employment payroll of the Cleveland company numbers

It's OUT—
it's NEW!



BULLETIN

184

UNION
PILE

DRIVING EQUIPMENT

Over 31 BIG pages packed with photos, tables, features, blueprints, specifications, diagrams, details of Union Pile Hammers, Sheet Pile Hammers, Hose, Driving Leads, Handling Equipment, Extracting Rigs, Hoists and related construction equipment—all new, modern... the information you want to bid lower, and get that job, work faster, make more money. You know UNION and our 30 years experience. Need we say more?

WRITE for your copy. Just send us your name and address and we'll put one in the mail—and YOU profit!

UNION IRON WORKS, INC.
775 LIDGEWOOD AVENUE, ELIZABETH, N. J.

What's the Address?

C.H.&E.

SELF-PRIMING CENTRIFUGAL PUMPS



- FAST PRIMING
- HIGH EFFICIENCY
- ECONOMICAL OPERATION
- TRASH TYPE IMPELLERS
- ROLLER BEARINGS
- 11 SIZES
- 3,000 TO 200,000 G.P.H.

Send For Bulletin SPP-40

A COMPLETE LINE OF PUMPS • SAWRIGS
HOISTS • MORTAR MIXERS • SMALL ROLLERS
BAR CUTTERS AND BENDERS

C. H. & E. MANUFACTURING CO.
3847 N. Palmer St., Milwaukee, Wis.

about 1,000 employees. Equipment comprises 78 trucks, 7 tractor-bulldozers, 7 cranes and shovels, and a large and complete stock of hand tools, including many specialized tools which enable the wreckers to salvage the material with the least possible damage.

★ ★ ★

Concrete and Steel Pipe

FOR CALIFORNIA WATERWORKS

(Continued from page 49)

pipe was mixed by customary methods at a central mixer for the plant, and was placed in the forms from a hopper on a movable placing gantry. Stationary electric vibrators attached to the forms moderately vibrated the concrete while it was being placed in the forms. After the concrete was placed it was worked by a novel device, consisting of an air-actuated rotary steel rod, about 3 ft. longer than the depth of the form, revolved at about 500 r.p.m. while it was pushed down into the concrete along the face of the form. Excellent dense concrete with smooth surfaces free from air and water pockets was obtained by this method.

Forms were stripped after about 12 hr. and the pipe was tipped off the base ring during the third day. The outer surfaces of the pipe were kept wet for several hours after stripping and then sprayed while wet with two coats of coal tar cutback, which were covered with whitewash. Both ends of the pipe were closed with portable bulkheads and the inside of the pipe was cured for about two weeks with a water spray operated automatically by clock control.

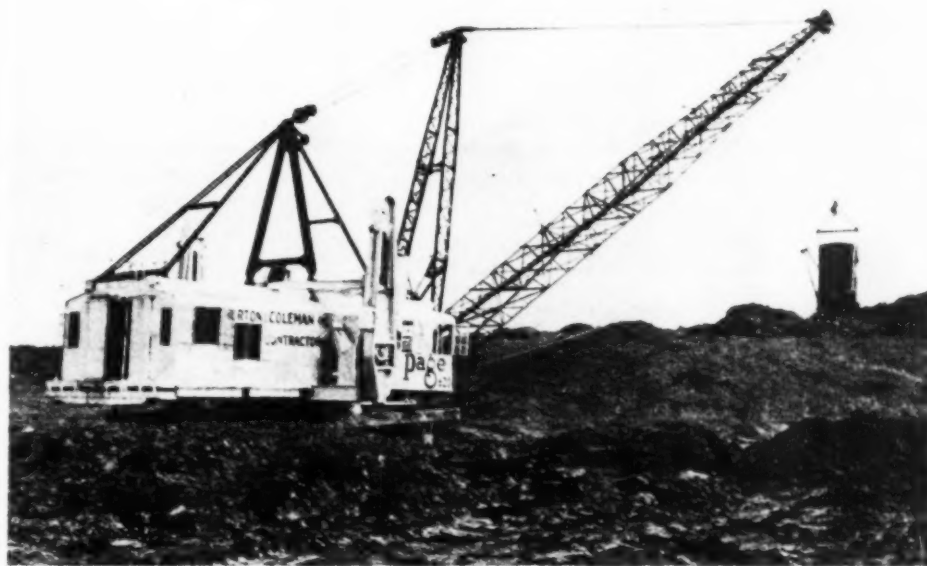
Because of the great weight of the pipe sections, ranging from 26 to 43 tons, depending upon diameter, special equipment was developed both for transporting the pipe from the yard to the trench side, and for installing the pipe in the trench. All of the trucks used for transportation were of the same general design, but the three contractors used different types of machines for placing the pipe in the trench. This difference was due mainly to variable right-of-way conditions.

The equipment used in the open country east of Ontario for placing the 11 ft. 8 in. and 12 ft. 8 in.-diameter pipe in this area consisted of a steam-operated stiff leg derrick mounted on a structural steel frame which traveled on a 48-ft.-gauge track spanning the trench. The placer used through citrus groves and in city streets

(Continued on page 112)

A PAGE WALKING DRAGLINE will do the job in record time!

*Diesel or electric powered Draglines
3½-cubic-yard capacity and larger*



Horton & Coleman used this Page Walker on levee work near Pine Bluff, Arkansas. The machine has a 120-foot boom and used a light-weight 5-cubic-yard Page Bucket.

Page Walkers are fast dragline machines that are establishing new yardage and profit records for their owners.

The rugged design and the dependable Page Diesel engine assure low maintenance and operating cost. Moreover, the positive crank-action walking mechanism and the large circular base permit immediate movement in any direction, give greater freedom from ground and weather conditions.

Before buying any dragline, learn all about a Page Walker in a size suitable for your job.

PAGE ENGINEERING COMPANY

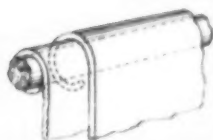
Page Automatic Dragline Buckets • Page Walking Dragline Machines
CLEARING POST OFFICE, CHICAGO, ILLINOIS

Lightens THE LOAD

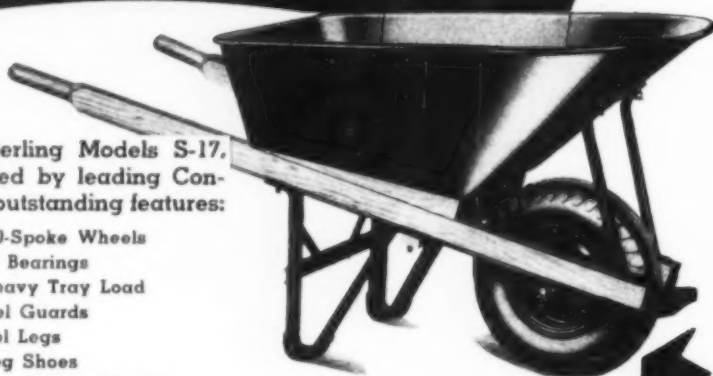
FOR concrete work, Sterling Models S-17, S-18 and S-19 are selected by leading Contractors because of these outstanding features:

Perfect Balance 10-Spoke Wheels
Self-Lubricating Bearings
Welded Trays Heavy Tray Load
Malleable Wheel Guards
Channel Steel Legs
Square-Bent Leg Shoes
Hard Maple Handles Interchangeable Parts
Malleable Iron Wheel Brackets

Capacities 3, 3½ and 4 cu. ft. struck.
Complete stocks available from Warehouses
and Distributors in principal cities.



An Exclusive Sterling Feature
Where tray sheets lap, both thicknesses are folded over the continuous butt-welded reinforcing rod, thus giving additional rigidity and strength.



**MOST OF THE LOAD
IS CARRIED ON THE WHEEL**

Sterling Models S-17, S-18 and S-19 are also used for general purpose work, handling sand, gravel, brick, etc. In this service, they have a maximum capacity of 4, 4½ and 5 cubic feet, respectively.

**STERLING WHEELBARROW
COMPANY**

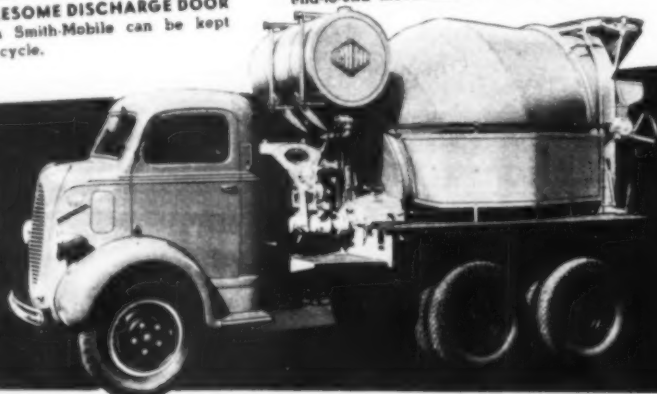
MILWAUKEE, WISCONSIN

SMITH-MOBILE THE Modern TRUCK MIXER and AGITATOR

**It's TOPS . . . and here are 11 Reasons why
SMITH-MOBILE Excels**

- 1 **HIGH DISCHARGE** — 27" to 34" higher than old-style truck mixers. No hoist or ramp required.
- 2 **CONTROLLED DISCHARGE** — pour it fast or slow. The concrete comes out in a smooth steady flow and without segregation.
- 3 **VISIBLE MIXING** — Open the door and look into drum while drum is revolving. Watch the mix. SEE what's going on inside.
- 4 **FEED CHUTE CHARGING** — Loaded on the level, no ramp needed. Easy to spot under bin.
- 5 **DRUM REVOLVES WHILE CHARGING** — Shrink- ing and mixing start instantly. Carries larger loads.
- 6 **NO LOADING HATCHES** to open or close. Driver can stay right in cab.
- 7 **NO LEAKY TROUBLESOME DISCHARGE DOOR** — Closing door on Smith-Mobile can be kept open during mixing cycle.

- 8 **WATER INTRODUCED THROUGH CHARGING OPENING** — Water nozzle located in top part of drum, well above concrete. High pressure pump furnished as regular equipment.
- 9 **STEEP DISTRIBUTING CHUTE FOR DRY CON- CRETE** — Will spout dry concrete directly into high forms, buckets, concrete carts, etc., without pushing it down the chute.
- 10 **LARGER RADIUS OF SPOUT DISTRIBUTION** — Use the spout for pouring directly into forms in- stead of using carts or wheelbarrows.
- 11 **BETTER AND FASTER MIXING** — Scientifically designed T-shaped spiral blades provide a fast end-to-end movement of the aggregates.



Endorsed by Ready
Mixed Plant Oper-
ators All Over the
Country. Five sizes.
Write for Catalog.

The T. L. SMITH CO., 2851 N. 32nd St., Milwaukee, Wis., U. S. A.

(Continued from page 111)

for the 11 ft. 8 in.-diameter pipe line be-
tween Ontario and San Dimas consisted of
a truss-type gantry which spanned the
trench and traveled on rails laid to a 38-
ft. gage; this machine was electrically op-
erated. For laying the smaller-sized pipe
used west of San Dimas, 10 ft. 3 in. and 9
ft. 8 in. diameter, a heavy crawler-type
crane was used. This crane traveled along
the construction road at the side of the
trench.

All of the precast concrete pipe was
bedded in concrete cradle. Normal laying
progress on the precast concrete pipe
varied from 12 to 16 sections, or 144 to
192 lin. ft. per day, depending upon the
capacity of the manufacturing plant. In
general, this amount of pipe could be
placed in the trench during an 8-hr. shift.

After completion, all pipe lines were
filled with water and tested for leakage
under full operating heads. The specifica-
tions for the work provided that the leak-
age loss per inch of diameter per mile of
line should not exceed 15 gal. per day for
the steel pipe and 100 gal. per day for the
precast concrete pipe. The actual losses
which occurred during the test periods
were in all cases substantially less than
the maximum allowed and average, re-
spectively, 7 gal. and 32 gal. per inch of
diameter per mile of line per day for the
steel line and precast concrete lines, re-
spectively.

Tunnels and Siphons

West of Glendora the upper feeder con-
sists of a series of tunnels and siphons
of various lengths. Except at three short
canyon crossings, where cast-in-place con-
crete construction is provided, the siphons
consist of precast concrete pipe. The tun-
nels are lined with concrete and have a
finished diameter of 10 ft. Due to differ-
ence in construction methods the tunnels
are classified into two distinctive types,
namely, tunnels in rock and tunnels in
alluvium, based upon the type of ground
through which they pass.

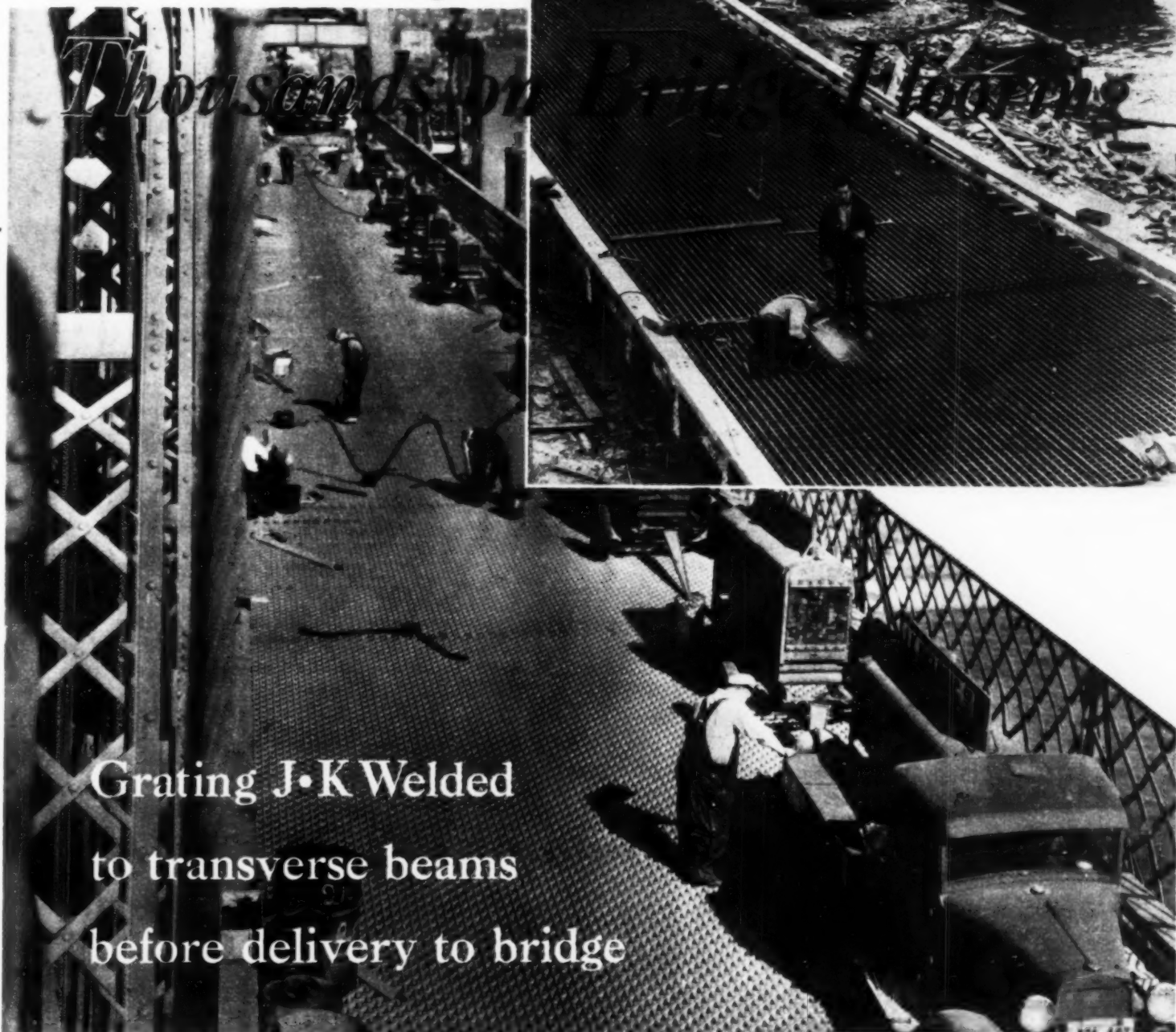
To avoid interference with improve-
ments and traffic and inconvenience to the
public which accompanies the construction
of large pipe lines through narrow streets
in highly developed residential areas, por-
tions of the upper feeder through the cities
of Sierra Madre and Pasadena were con-
structed as tunnels through the alluvium
underlying these cities at depths of 30 to
70 ft. below the ground surface. These
are the Sierra Madre and Pasadena tun-
nels, 1.3 and 3.4 mi. in length, respectively.

Cross Feeders

The Palos Verdes cross feeder, extend-
ing from the upper feeder near Eagle
Rock to its regulating reservoir near San
Pedro, has been constructed to serve a part
of Los Angeles and member cities in the
southwestern part of the metropolitan
area. Appurtenant to this main cross
feeder are laterals to Long Beach, Tor-
rance and Compton. All of these lines are
of welded steel pipe, coated on the inside

(Continued on page 114)

J·K Pre-fabricating Saves



Grating J·K Welded
to transverse beams
before delivery to bridge

Some \$50,000 was estimated as the saving in steel erection costs made possible by unusual J. K. Welding's prefabricating methods, in the installation of steel grating on the 20 ft. outer roadways of the 1560' main span and the two 620' end spans of the Williamsburg Bridge, New York City.

In prefabricating 20' steel floor panels for the bridge roadways, the panels were lined up and welded 20 at a time on a 400' long jig at the Brooklyn waterfront yard of the J. K. Welding Co. Each 20' panel consisted of two sections 12 x 20 and 8 x 20 ft. welded to the transverse underfloor beams.

The small photo at right shows panels for end spans being welded on the jig.

The larger photo shows work on the bridge roadway, the J. K. welded deck panels placed

in position and transverse floor members being welded to the bridge stringers by J. K. Welding operators, drawing current from the large battery of portable generators. This work was done under the direction of the New York City Department of Public Works.

THE AMERICAN BRIDGE COMPANY fabricated all structural steel for the roadways and the I-Beam-Lok grating for the end spans, delivering the material by lighters to the J. K. yard.

OTHER J. K. JOBS NOW UNDER CONTRACT:

Housatonic River Bridge, Conn. Welding I-Beam-Lok steel grating for the AMERICAN BRIDGE COMPANY.

Susquehanna River Bridge, Havre

de Grace, Md. Welding steel grating for BETHLEHEM STEEL COMPANY.

Raritan River (Thomas A. Edison Memorial) Bridge, Perth Amboy, N. J. Welding Bethlehem bar trusses for JOHN G. ENGLISH, Inc., and JOSEPH NESTO & COMPANY.

Pit River Bridge, Calif. Welding steel reinforcing bars for piers in conjunction with SOULE STEEL COMPANY for UNION PAVING COMPANY.

J·K WELDING CO., INC.

43-19 37th Street

LONG ISLAND CITY, NEW YORK

*Just sweep
your troubles away!*

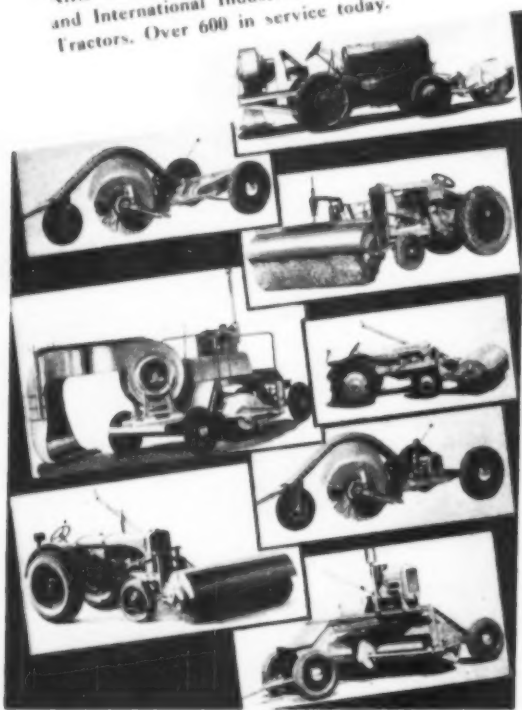
It's easy with a Hough Sweeper or Sweeper-Blower—on black top and oil mix subgrade jobs—on finished concrete, shoulder or gutter work—sweeping walks, parkways, playground and parking areas.

These versatile utility machines find a myriad of applications on jobs that are otherwise time and labor consuming, quickly returning their cost by eliminating labor fatigue, reducing labor costs and cutting job time up to 80%. Hundreds in use by contractors, county, state and federal engineers.

Send for descriptive literature on the type of Hough Sweeper or Sweeper-Blower you need for your work—do it now!

THE FRANK G. HOUGH CO.
Libertyville, Illinois

• Made in eight types, Hough Sweepers and Sweeper-Blowers are available in trailer models and models powered by Allis-Chalmers, IH, IU and WF Tractors and International Industrial Wheel Type Tractors. Over 600 in service today.



HOUGH
Since 1920

(Continued from page 112)

with a 1/2-in. thickness of cement mortar, centrifugally applied by a spinning process, and coated on the outside with a 3/4-in. thickness of Gunitite reinforced with wire mesh. A layer of coal tar enamel is used underneath the external gunitite coating where corrosive soils are encountered.

These lines are located to a large extent in city streets. In congested areas excavation was accomplished with a ladder type trenching machine producing vertical trench walls which generally require sheeting. In open, undeveloped areas trenches were excavated also by dragline. Work on these city lines was hampered by restricted working space, urban traffic, and the necessity of avoiding or moving previously installed utilities.

To prevent deflection of the pipe and cracking of the mortar lining as a result of the heavy load of unconsolidated backfill, temporary steel bulkheads were placed at each manhole, about 1,000 ft. apart, and the pipe line maintained full of water under pressure during the backfilling operations, and thereafter until the backfill becomes consolidated.

The initial development of the distributing system, and of its appurtenant works, with a length of 150 mi. serving 13 cities comprising the Metropolitan Water District of Southern California, will have a capacity of 500,000,000 gal. of water per day, or one-half the capacity of the main line of the Colorado River aqueduct. As the demand for water increases in the district area, additional feeders and laterals will be constructed to bring the capacity of the distributing system up to that of the main aqueduct, or 1,000,000,000 gal. of water daily.

Thus the problem of connecting the Colorado River aqueduct to the faucet in the kitchen of Mrs. John Smith is not simply a matter of laying a few thousand sections of pipe through the hills. It is a vast engineering project in itself, one of which future generations will know little as they drive over the buried line or partake of the clear sparkling water it carries.

★ ★ ★

Step-by-Step Field Methods

(Continued from page 59)

was consumed in distributing the structural material around the base timber and in starting column erection. One man, meanwhile had drilled holes in the timber base plate on which the columns are seated.

The columns consist of bolted, backed-up channels, fitted with lugs at top, bottom and intermediate points. As the men set the columns near the place of use, they loosen the top bolts; this is done to sep-

OSGOOD



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DRAGLINES
CRANES
TRUCK SHOVELS, ETC.**
3/8 to 2 Cu. Yds.

HERCULES ROAD ROLLERS

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THE OSGOOD CO.
MARION, OHIO

**New AMAZINGLY HARD
DRILL-POINTS**



**DRILL CONCRETE
50-75% FASTER**

(For Use in Rotary Drills)

Amazing new drill-point contains special metal harder than hardest steel. Goes through concrete, tile, slate, porcelain, etc., 50 to 75% faster. Drills cleaner, more accurate holes. Speeds up installation of expansion anchors. Saves your skilled time for more profitable work. Eliminates noisy hammering, monotonous chiseling. Doesn't splinter fragile work. No special equipment needed—use in any rotary drill. Get your share of those extra profits now possible. Send coupon for leaflet.

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Send free leaflet on Carboloy Masonry Drill-Points, for drilling concrete 75% faster.

Name
Company
Street State
City

**CARBOLOY
MASONRY DRILL-POINTS**

arate the channels at the column top so as to permit subsequent entry of the roof truss connection. They then tighten the base lugs (angles) and attach any missing intermediate lugs. For the building in question the intermediate lug is the connection for the sheeting girt; the top lug supports the eave strut and the lug immediately below the top one is required for girting windows and top wall sheets.

As soon as enough material has been laid out, 2-man teams begin erecting the columns and tying them with struts. In this procedure, one man climbs to the intermediate strut as soon as a double column and strut combination is rigid enough to support him. With one man working the top, and the other feeding material as well as anchoring the columns with lag screws, the progress is rapid.

The columns and side struts were in place before 9:45 a.m. Before the first hour had elapsed, however, two men had put the finishing touches to the "Dutchman", an improvised A-frame gin-pole rig. This gin-pole is equipped with block and tackle and guyed with rope at front and back.

At 10 a.m. the first roof truss was hoisted into place. Fig. 2 shows the second truss going into place at 10:30 a.m. While 6 men are observed on this operation, 5 men actually comprise the best working combination for units of this size. As a matter of fact, a team of 5 men sets all of the remaining trusses on this building. The other 2 men did the follow-through—tightened the bolts with ratchet wrenches and placed the roof purlins.

When the trusses had been placed, 2 men were directed into strut and jamb setting at the front end; 2 men at the back end; 2 men continued with the roof purlins and bottom chord struts; and the odd member placed the sill angle at the base. During the remainder of the first day's work the turn-over of specific functions was rather rapid because the heavy work had been completed. Adjustments and alignment of the members are an important part of the last phase of the structural erection.

It is the practice on this size of building to use brace rods on the two end bays and in one intermediate bay. Seven pairs of brace rods are used in each of these bays, and these pairs are diagonally placed across the sides, the roof slopes and the three bottom chord sections. Apart from considerations of strength and rigidity, proper alignment facilitates the subsequent sheeting operations. This operation was done before the close of the first shift and the remaining time was consumed in sorting out and conveniently distributing the wall sheets and accessories.

Placing Sheeting

The sheeting operation may begin at any point in the wall, but best results are obtained when 2-man teams begin with a corner sheet. All of the sheets are formed in the Blaw-Knox fabricating shop, and are shipped to the job ready for use without the necessity for any special forming.

In placing the wall sheets, which have

(Continued on page 116)

"There's the BEST 'dog-gone' pump I ever owned!"

GUY VILLA & SONS, INC.
ENGINEERS AND
CONTRACTORS
WESTFIELD, N. J.
TEL. WESTFIELD 2-2857



**Send
the
coupon**

"I put this Novo pump to work when I first started this job, and it has kept the whole excavation dry ever since. Many times we kept it running 24-hours a day—never less than 10. Day in and week out it throws out the water as it comes—thousands of gallons or just a trickle."

Guy Villa bought this 4" Novo Diaphragm Pump from the Smith Tractor & Equipment Company, the Novo Distributor at Irvington, N. J., and you should hear him sing its praises! Why shouldn't he with such performance? You would, too, with Novo Pumps on your job—

Novo Diaphragm Pumps operate on the old "fool-proof" principle but have been redesigned for easy portability, light weight and accessibility. Here's the pump for mucky, trash-laden water.

Then there are these Novo Self-priming Centrifugal Pumps—the ones that have jumped far into the lead in the pump field for performance, volume, fast priming time, and continuous service. They have two wear plates (one on each side of the impeller) for easy adjustment in case of excessive impeller wear.

Get the full information and prices. Novo Pumps are guaranteed to meet the A. G. C. Standards.

NOVO ENGINE CO., 214 Porter St., Lansing, Mich.

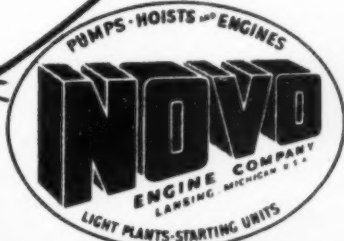
Send me full information on Novo Diaphragm Pumps ☐

Self-priming Centrifugal ☐

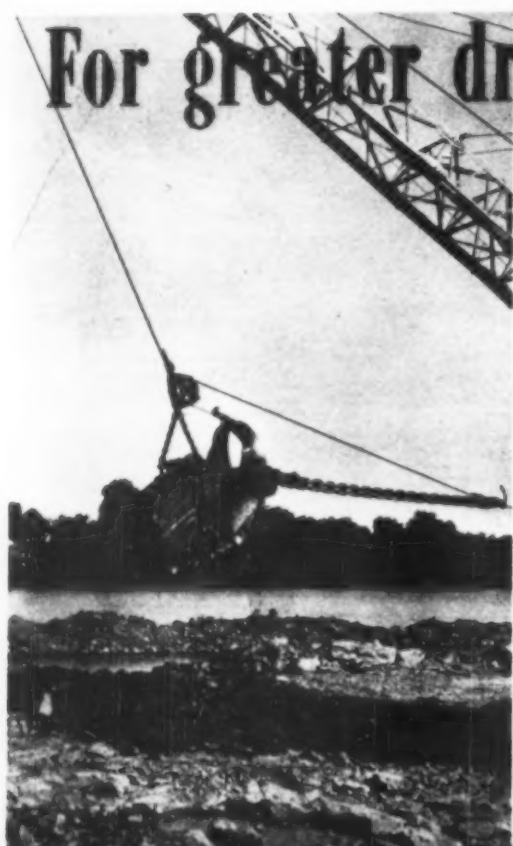
Name

Address

City State



NOVO ENGINE COMPANY **LANSING, MICHIGAN**



For greater dragline yardage dig with a Page Automatic!

A bucket for every machine and job; capacities $\frac{3}{8}$ to 15 cubic yds.

As they have for other users, Page Automatic Dragline Buckets can help you increase yardage and profit. The patented rounded-front design forces Automatic Buckets to use all their weight most effectively for digging; out-dig other buckets of equal size and weight.

See your equipment dealer or write direct for information about a Page Automatic Dragline Bucket of a size and weight for your machine and job!

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Page Automatic Dragline Buckets • Page Walking Dragline Machines
CLEARING POST OFFICE, CHICAGO, ILLINOIS

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*And what
you get in*

M. S. A. SKULLGARDS!

- ★ **PROTECTION** ... proved protection against head hazards. Laminated bakelite construction gives tremendous strength in resisting impact of falling objects, blows, bumps from any angle, and has high dielectric strength.
- ★ **COMFORT** ... easy on your head as an old felt hat! Skullgard's light weight; flexible sweatband; shock-absorbing inner hammock, all add up to finest wearing ease under every service condition.
- ★ **DURABILITY** ... for your money's worth! Skullgard can't soften, swell or deteriorate from the effects of water, grease, oil or perspiration.
- ★ **CORRECT SHAPE** ... for every choice and job! Skullgard's eight different styles are each scientifically developed for all-around head protection, each available in standard sizes.
- ★ **VENTILATION, SANITATION** ... for health and comfort! Skullgard's air-spaces between head and hat provide natural air circulation without harmful drafts. Impervious shell permits thorough cleaning and sterilization whenever desired—by boiling water or other accepted means.

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(Continued from page 115)

been laid out in accordance with blue print schedule for the window and door locations, the 2-man teams again display the top and bottom method. Fig. 4 is a closeup of one team at work; the man at the top is sliding the interlocking cap over the ends of two sheets to make the joint.

Fig. 5 illustrates progress of two sheeting teams moving toward each other from opposite ends of the same side. By 9:30 a.m. on the second day of work, one side of wall sheets had been placed; by 10:00 a.m. the wall sheets of the front end were installed. In another half hour more material had been distributed, and roof sheets and gable wall sheets, including a louvre, had been placed at the front end.

Fig. 7 shows the results of 17 crew-hours of work. The walls and lower course of the roof have been sheeted. Note that the crew has its next batch of material properly and conveniently distributed. Before noon on the third day, the last roof sheet was set in place.

Fig. 9 was taken just before completion of the job. The sheeting has been finished, the doors and ventilators installed and glazing work is well under way. This work was finished just before 4 p.m. on the third day of work.

Views of other building units are shown in the remaining illustrations. Fig. 11 is a view of the working headquarters at Shaft 2. Erection of the change house at this shaft, also 30x80x10 ft., consumed more than 250 man-hours; while the compressor house, 24x70x12 ft., required nearly 200 man-hours.

Fig. 12 shows the blacksmith shop which has dimensions of 30x70x12 ft.; and was erected in approximately 200 man-hours.

★ ★ ★

Open-Web Framing SUPPORTS FLOORS

(Continued from page 65)

The list of completed stores or additions includes stores in Easton, Allentown, Philadelphia and two stores in Wilmington, one recently completed and the other now under construction. The open-web joists, which were supplied by Bethlehem Steel Co., are made up of relatively light-weight angle or T-sections that are welded truss-fashion to larger angles that form the flanges or top and bottom chords of the built-up member. As used in the Woolworth stores they vary from 22 to 39 ft. in length and from 18 to 26 in. in depth.

The first application of a similar method of framing made by the Woolworth stores was in the rebuilding of the store on Germantown Ave. in Philadelphia. One of the advantages claimed for the open-web members is their adaptability to concrete

slab floor construction. In the Germantown store the original plan had been to employ wood supporting members. When the job was re-estimated on the basis of open-web steel members (which were riveted, however, rather than shop-welded) it was found that by use of concrete floor slabs in conjunction with trussed construction a sizeable area of tiling around a lunch counter could be dispensed with. The resultant saving more than paid for the slightly greater cost of the steel as compared with wood construction. In the Germantown Ave. store the open-web joists were especially designed and fabricated with reference to the job. In similar construction employed subsequently in other stores standard shop-welded joists were used, resulting in an additional saving.

Joists for Store Expansion

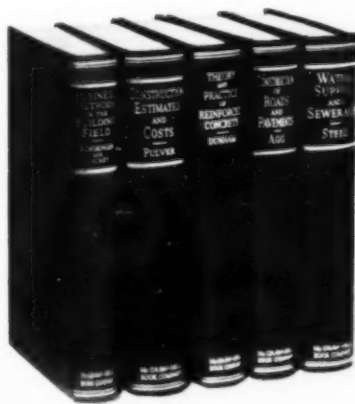
In an addition that was made to the Woolworth store in Easton a direct comparison was afforded between open-web construction and conventional construction. In Easton, a store 80x120 ft. of two stories was expanded into a one and two-story structure of 80x240-ft. dimensions. Light open-web construction was utilized for the roof of the one-story portion with a hung ceiling beneath it, and it was also used for supporting a part of the first floor. The first floor of the existing store, however, had been built of standard steel construction, and it seemed for this reason most practicable to employ similar construction for the major part of the added space on the first floor. As contrasted with standard beam and slab construction it was computed that an average saving of three days was effected per floor in the time required for pouring the concrete slabs. The closer spacing between the long-span joists permitted the use of lighter floor slabs, and this made possible the transfer of the slab forms by panels from floor to floor without disassembling them, as concreting progressed. Likewise, there was an important saving in time required for erecting the roof steel.

Air-Conditioning Ducts

It has also been found that open-web construction promotes flexibility in the location of ducts in the air-conditioning systems that are a feature of all of these Woolworth stores. Duct-work can be run crossways through open-web construction of the trusses as well as parallel to them. Thus, return openings in the air-conditioning layout can be placed beneath counters at any desired location. This saves valuable wall space which otherwise would be taken up with return air grills. Furthermore, the location of the return openings in a more central area also promotes the efficient operation of the air conditioning systems. The open-web joists also frequently help to provide the needed space for anemostats. Since flat ceilings free of incased beams or ducts were mandatory, a saving of 3 to 4 in. in ceiling height was also made possible by employing open-web construction. The open spaces in the joists similarly facilitate electrical wiring and the placing of water and steam lines.

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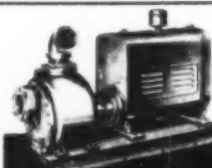
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